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Mollusca Bivalvia: Pectinoidea (Propeamussiidae and Pectinidae) from eastern Indonesia

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ABSTRACT

Thirty species of Pectinoidea are reported from off the Kai and Tanimbar Islands, Arafura Sea, at shelf to bathyal depths (111-1244 m). Of these, eight are new records for the Indonesian Archipelago and two are new species: *Parvamussium conspectum* sp. nov. (Propeamussiidae) and *Veprichlamys versipellis* sp. nov. (Pectinidae). On average, the bathymetric occurence of species is shallower in the study area than in the South-West Pacific. *Amussium margaritiferum* Dautzenberg & Bavay, 1912, is synonymized with *Propeamussium investigatoris* (E.A. Smith, 1906), and *Parvamussium crypticum* Hayami & Kase, 1993, is synonymized with *P. carbaseum* Dijkstra, 1991. Lectotypes are designated for five nominal taxa.

RÉSUMÉ

Mollusca Bivalvia : Pectinoidea (Propeamussiidae et Pectinidae) de l'Indonésie orientale.

Au cours de la campagne océanographique franco-indonésienne KARUBAR en mer d'Arafura, trente espèces de Pectinoidea ont été récoltées au voisinage des îles Kai et Tanimbar, sur le plateau et la pente continentals entre 111 m et 1244 m de profondeur. Sur ce total, huit sont signalées pour la première fois dans l'archipel indonésien et deux espèces nouvelles sont décrites : *Parvamussium conspectum* sp. nov. (Propeamussiidae) and *Veprichlamys versipellis* sp. nov. (Pectinidae). D'une manière générale, les espèces récoltées, déjà connues du Sud-Ouest Pacifique, ont été trouvées à des profondeurs moindres qu'ailleurs. *Amussium margaritiferum* Dautzenberg & Bavay, 1912, est mis en synonymie avec *Propeamussium investigatoris* (E.A. Smith, 1906), et *Parvamussium crypticum* Hayami & Kase, 1993, avec *P. carbaseum* Dijkstra, 1991. Des lectotypes sont désignés pour cinq espèces nominales.

DIJKSTRA, H. H. & KASTORO, W. W., 1997. — Mollusca Bivalvia: Pectinoidea (Propeamussiidae and Pectinidae) from eastern Indonesia. *In*: A. CROSNIER & P. BOUCHET (eds), Résultats des Campagnes MUSORSTOM, Volume 16. *Mém. Mus. natn. Hist. nat.*, **172**: 245-285. Paris ISBN: 2-85653-506-2.

INTRODUCTION

The fauna of the eastern seas of the Indonesian archipelago has remained little known to this date. The *Siboga* Expedition carried out nineteen stations (stns 250-268) near the Kai [= Kei] Islands in December 1899 (TYDEMAN, 1902: 14). At this occasion, seven species of Pectinoidea were collected in nearshore waters (DAUTZENBERG & BAVAY, 1912). Later, in 1922, during the Danish Expedition to the Kai Islands (MORTENSEN, 1923), Dr Th. MORTENSEN made 63 dredge and trawl hauls in sublittoral to bathyal depths. The Pectinoidea were never reported on, and this material (now in ZMUC) will be studied and treated elsewhere by the senior author. Finally, the Indonesian-Dutch SNELLIUS-II Expedition (1984-1985) did some sampling in the northwest of Banda Sea, but the investigations did not touch the Kai or Tanimbar Islands. The Pectinoidea of that expedition were described by DIJKSTRA (1991).

The present paper reports on the Propeamussiidae and Pectinidae collected during the Indonesian-French KARUBAR cruise. For a narrative of the cruise and complete station list, see CROSNIER, RICHER DE FORGES & BOUCHET (1997: this volume page 9). In addition, a few odd samples collected in 1980 during the CORINDON cruise in the strait of Makassar have also been considered. We follow the style and presentation of an earlier paper on deep-water Pectinoidea from the New Caledonia region (DIJKSTRA, 1995b), and extensive reference is made to that paper: lists of synonyms and references, diagnosis and descriptions are not repeated for species already discussed in the context of the New Caledonia fauna. The material is deposited in MNHN, Paris and POLIPI, Jakarta, with voucher specimens in the private collection of the senior author. Comparative material from Indonesia and type material was studied from various museum collections, namely AMS, BMNH, MNHN, RMNH, WAM, ZMA, ZMUC, ZSI.

ABBREVIATIONS AND TEXT CONVENTIONS

Repositories

AMS	Australian Museum, Sydney
BMNH	The Natural History Museum, London
HD	H.H. Dijkstra collection, Sneek
IGPS	Institute of Geology and Palaeontology, Sendai
IOAS	Institute of Oceanology, Academia Siniea, Qingdao
KBIN	Institut Royal des Sciences Naturelles de Belgique, Bruxelles
POLIPI	Puslitbang Oseanologi-LIPI [Research and Development Centre for Oceanology - Indonesian Institute of Sciences], Jakarta
MNHN	Muséum national d'Histoire naturelle, Paris
NMNZ	Museum of New Zealand *Te Papa Tongarewa*, Wellington
NMW	National Museum of Wales, Cardiff
NSMT	National Science Museum, Tokyo
RMNH	Nationaal Natuurhistorisch Museum, Leiden
UMUT	University Museum, University of Tokyo, Tokyo
USNM	National Museum of Natural History, Washington, DC
WAM	Western Australian Museum, Perth
ZMA	Zoölogisch Museum, Amsterdam
ZMUC	Zoologisk Museum, Copenhagen
ZSI	Zoological Survey of India, Calcutta.

Other abbreviations

OD	Original designation
SD	Subsequent designation

db	paired valves
lv	left valve(s)
rv	right valve(s)
v	valve(s)
spm(s)	live-taken specimen(s)
H	height of shell (dorsal-ventral)
L	length (width) of shell (anterior-posterior)
D	diameter of shell.

SYSTEMATIC ACCOUNT

Class BIVALVIA Linnaeus, 1758

Subclass PTERIOMORPHIA Beurlen, 1944 [emend., Boss, 1982]

Superorder EUPTERIOMORPHIA Boss, 1982

Order OSTREOIDA Waller, 1978

Suborder PECTININA Waller, 1978

Superfamily PECTINOIDEA Wilkes, 1810 [emend., Waller, 1978]

Family PROPEAMUSSIIDAE Abbott, 1954

Genus ***PROPEAMUSSIUM*** de Gregorio, 1884

Propeamussium alcocki (E.A. Smith, 1894)

Figs 1-4

Amussium alcocki E.A. Smith, 1894: 172, pl. 5, figs 15-16.
Propeamussium alcocki - DIJKSTRA, 1995b: 13, figs 1-4, 133-137 [references, description, discussion].

MATERIAL EXAMINED. — The type material (see DIJKSTRA, 1995b: 13).
Indonesia. KARUBAR, *Tanimbar Islands*: stn CP 52, 08°03'S, 131°48'E, 1244-1266 m, 3 spms. — Stn CP 53, 08°18'S, 131°41'E, 1026-1053 m, 2 spms. — Stn CP 89, 08°39'S, 131°08'E, 1058-1084 m, 3 spms. — Stn CP 91, 08°44'S, 131°05'E, 884-891 m, 17 spms, 1 lv.

DISTRIBUTION. — Gulf of Aden, Laccadive Sea, Bay of Bengal, Coral Sea, New Caledonia, and Loyalty Islands (DIJKSTRA, 1995b: 13). Now the Arafura Sea. Present material alive in 891-1244 m.

Propeamussium caducum (E.A. Smith, 1885)

Figs 5-8

Amussium caducum E.A. Smith, 1885: 309, pl. 23, figs 1-1c.
Propeamussium caducum - DIJKSTRA, 1995b: 15, figs 9-10, 129-132 [synonymy, references, description].

MATERIAL EXAMINED. — The type material (see DIJKSTRA, 1995b: 17).
Indonesia. CORINDON, *Makassar Strait*: stn B 247, 00°55'S, 119°26'E, 520 m, 1 rv.
KARUBAR, *Kai Islands*: stn CP 35, 06°08'S, 132°45'E, 390-502 m, 1 lv. — Stn CP 39, 07°47'S, 132°26'E, 466-477 m, 17 spms.
Tanimbar Islands: stn CP 54, 08°21'S, 131°43'E, 836-869 m, 4 spms, 2 lv, 1 rv. — Stn CC 56, 08°16'S, 131°59'E, 549-552 m, 29 spms. — Stn CC 57, 08°19'S, 131°53'E, 603-620 m, 6 spms. — Stn CC 58, 08°19'S, 132°02'E, 457-

461 m, 3 spms, 3 lv, 4 rv. — Stn CP 71, 08°38'S, 131°44'E, 477-480 m, >50 spms, 7 lv, 3 rv. — Stn CP 72, 08°36'S, 131°33'E, 676-699 m, >50 spms, 7 lv, 4 rv. — Stn CP 73, 08°29'S, 131°33'E, 840-855 m, 2 spms. — Stn CP 75, 08°46'S, 131°36'E, 451-452 m, 17 spms, 3 lv, 1 rv.

DISTRIBUTION. — Japan, Philippines, Indonesia (DAUTZENBERG & BAVAY, 1912, THIELE & JAECKEL, 1931, DIJKSTRA, 1991), Bay of Bengal, Arabian Sea, Gulf of Aden, Tanzania, New Caledonia. Present material alive in 452-840 m.

REMARKS. — The present specimens are similar to the type material, but the growth lines are weaker, there are no radial striae on the left valve, internal ribs number 9 (instead of 10 in the type material), and the colour is cream instead of whitish transparent.

Propeamussium ina (Dautzenberg & Bavay, 1912)

Figs 9-10

Amussium ina Dautzenberg & Bavay, 1912: 32, pl. 28, figs 18-21.
Propeamussium (Parvamussium) ina - DIJKSTRA, 1990: 9, 10.
Parvamussium ina - ROMBOUTS, 1991: 68.

MATERIAL EXAMINED. — The type material (see below).
Indonesia. CORINDON, *Makassar Strait*: stn B 268, 01°57'S, 119°16'E, 200 m, 2 lv.
KARUBAR, *Kai Islands*: stn DW 31, 05°40'S, 132°51'E, 288-289 m, 1 rv (see Remarks).

TYPE MATERIAL. — Lectotype (H 14, L 14, D 6.5 mm) ZMA Moll. 3.12.011, here designated, live taken. Two paralectotypes: ZMA Moll. 3.12.012. DIJKSTRA (1990: 10) noticed the existence of three complete specimens in ZMA, instead of 4 valves mentioned by DAUTZENBERG & BAVAY (1912: 32). BAVAY's manuscript in KBIN mentions these specimens.

TYPE LOCALITY. — *"Siboga"*, stn 312, 08°19'S, 117°41'E, Saleh Bay, North coast of Sumbawa, Indonesia, 274 m.

DISTRIBUTION. — Indonesia, shells in 200-288 m, live record in 274 m.

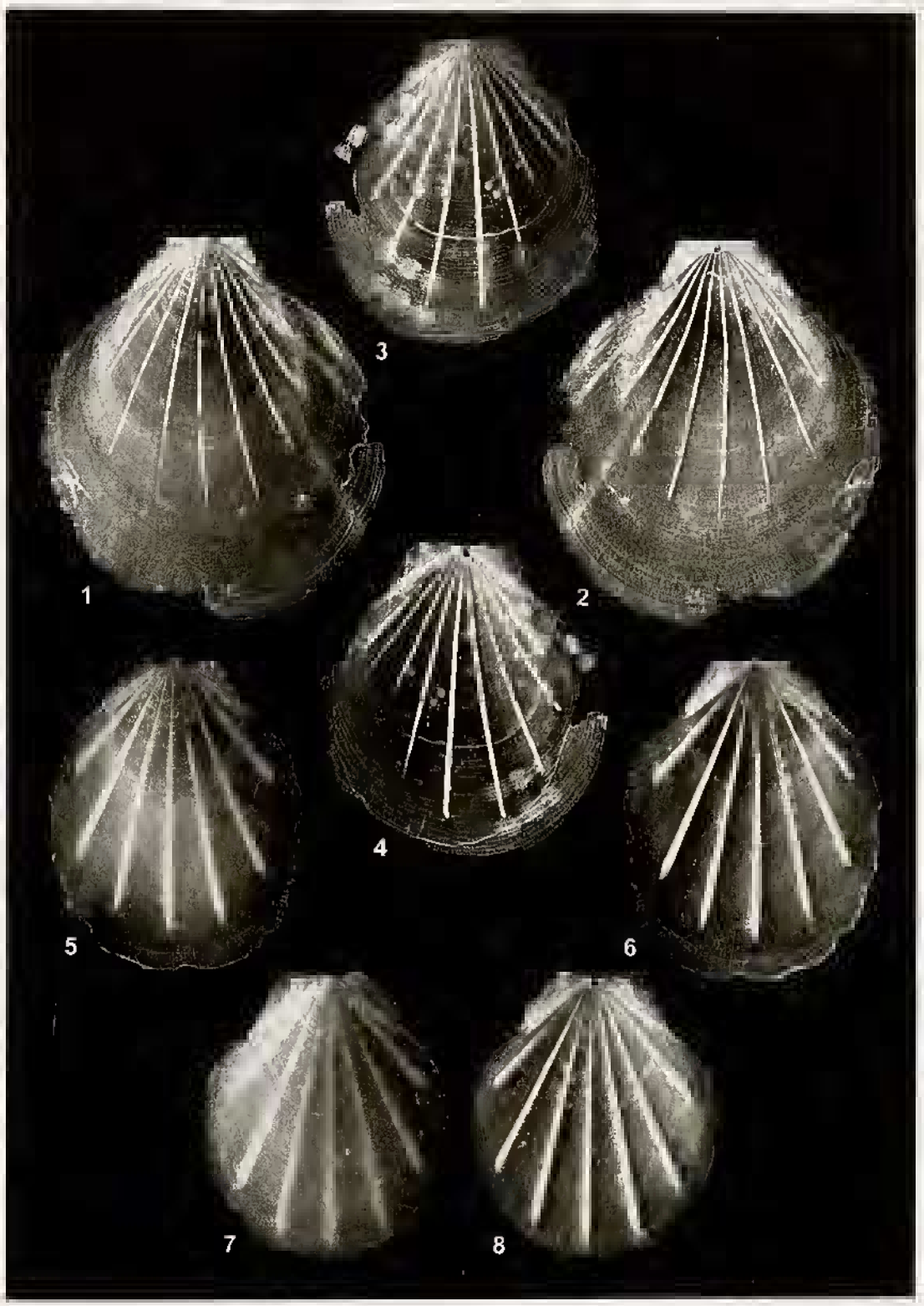
DESCRIPTION. — *Shell* small, up to *ca.* 14 mm high, fragile, transparent, slightly orbicular, equivalve, inequilateral, slightly convex, auricles unequal, umbonal angle *ca.* 105°. *Prodissoconch ca.* 200 µm in height. *Both valves* smooth, fine concentric striae on right valve. Auricles unequal with some more striae. Marginal apron very fragile and mostly broken off. Internal ribs 6 and 2 small auricular ribs. Hinge line straight. Resilifer triangular. No byssal fasciole, no byssal notch. Ctenolium absent. Colour pale brown with numerous small reddish maculations on left valve, right valve paler without maculations, visible internal ribs whitish.

REMARKS. — The present specimen from the Kai Island is somewhat similar to the type material of *P. ina*, although more elongate (umbonal angle *ca.* 90°) and whitish transparent. *P. steindachneri* (Sturany, 1901), from the northeastern Indian Ocean and the Red Sea, differs somewhat by having a more elongate shape and its colour with larger reddish maculations and small whitish streaks. *P. rubrotinctum* (Oyama, 1951) from southern Japan to New Caledonia differs from *P. ina* by having more numerous internal ribs (commonly 10) and the maculations are somewhat larger.

Propeamussium investigatoris (E.A. Smith, 1906)

Figs 11-15

Amussium investigatoris E.A. Smith, 1906: 255.
Amussium margaritiferum Dautzenberg & Bavay, 1912: 36, pl. 27, figs 15-18. Syn. nov.



FIGS 1-4. — *Propeamussium alcocki* (E.A. Smith, 1894), KARUBAR, stn CP 91, 30.8 x 27.8 mm (db): **1**, left valve, exterior; **2**, left valve, interior; **3**, right valve, exterior; **4**, right valve, interior.

FIGS 5-8. — *P. caducum* (E.A. Smith, 1885), KARUBAR, stn CC 56, 17.0 x 13.9 mm (db): **5**, left valve, exterior; **6**, left valve, interior; **7**, right valve, exterior; **8**, right valve, interior.

MATERIAL EXAMINED. — The type material (see below).

Indonesia. KARUBAR, *Kai Islands:* stn CP 09, 05°23'S, 132°29'E, 368-389 m, 10 spms, 4 lv. — Stn CC 10, 05°21'S, 132°30'E, 329-389 m, 1 spm. — Stn CP 12, 05°23'S, 132°37'E, 413-436 m, 6 spms, 1 lv. — Stn DW 13, 05°26'S, 132°38'E, 417-425 m, 4 spms, 3 lv, 5 rv. — Stn CP 17, 05°15'S, 133°01'E, 439-459 m, 7 spms. — Stn CP 39, 07°47'S, 132°26'E, 466-477 m, 13 spms.

Tanimbar Islands: stn CP 65, 09°14'S, 132°27'E, 174-176 m, >50 spms. — Stn CP 69, 08°42'S, 131°53'E, 356-368 m, 46 spms, 3 lv, 2 rv. — Stn CP 77, 08°57'S, 131°27'E, 346-352 m, 23 spms, 1 lv. — Stn CP 78, 09°06'S, 131°24'E, 284-295 m, 4 spms, 1 lv.

TYPE MATERIAL. — *Amussium investigatoris:* lectotype (H 25.0, L 23.0, D 4.5 mm) ZSI M835/1, here designated, live taken. Three paralectotypes: ZSI M836-838/1 and two paralectotypes: BMNH 1906.10.12.99-100. Although the largest syntype (H 26.0, L 25.1, D 5.4 mm) is preserved at the BMNH, and closest to SMITH' s measurements, a syntype from the ZSI is selected as lectotype in accordance with SMITH (1894: 158). The type specimens are extremely fragile and the marginal apron often broken off. — *A. margaritiferum*: holotype ZMA Moll. 3.12.021.

TYPE LOCALITY. — *A. investigatoris*: *"Investigator"*, stn 248, 08°37'N, 75°37'E, W of Travancore, 410-519 m. — *A. margaritiferum*: *"Siboga"*, stn 137, 0°23.8'N, 127°29'E, channel between Makjan and Halmaheira, Moluccas, 472 m.

DISTRIBUTION. — Northern Indian Ocean and eastern Indonesia. Present material alive in 176-466 m.

DESCRIPTION. — *Shell* relative small, fragile and semi-transparent, up to *ca.* 25 mm high, suborbicular, equilateral, inequivalve, slightly convex, left valve somewhat more so than right, auricles equal, umbonal angle *ca.* 100-110°. *Prodissoconch ca.* 220 µm. *Left valve* sculptured with many irregularly spaced radial riblets, which are squamous near ventral margin. Latticed microsculpture only in early growth stage (*ca.* 10 mm in height). Anterior and posterior auricle with *ca.* 7-10 fine squamous radial riblets, weaker on right valve. *Right valve* sculptured with fine regularly spaced concentric lamellae. Internal riblets 10 with 2 auricular riblets, and a few (2-4) intercostal rudimentary riblets near the periphery. Hinge line straight. Resilifer triangular. No byssal fasciole, or byssal notch, no ctenolium. Colour of left valve orange-tinted, of right whitish.

REMARKS. — The present specimens correspond very well with the type material of *P. investigatoris*, although the latticed sculpture is somewhat less developed. *P. jeffreysii* (E.A. Smith, 1885), from the Philippines, differs by having a finer and more irregularly spaced radial sculpture, developed into concentric lamellae near the periphery of the left valve. *P. maorium* (Dell, 1956), from the SW Pacific, differs by having a smooth surface, lacking the latticed microsculpture, in early growth stage, and a finer radial sculpture on the left valve.

Propeamussium rubrotinctum (Oyama, 1951)

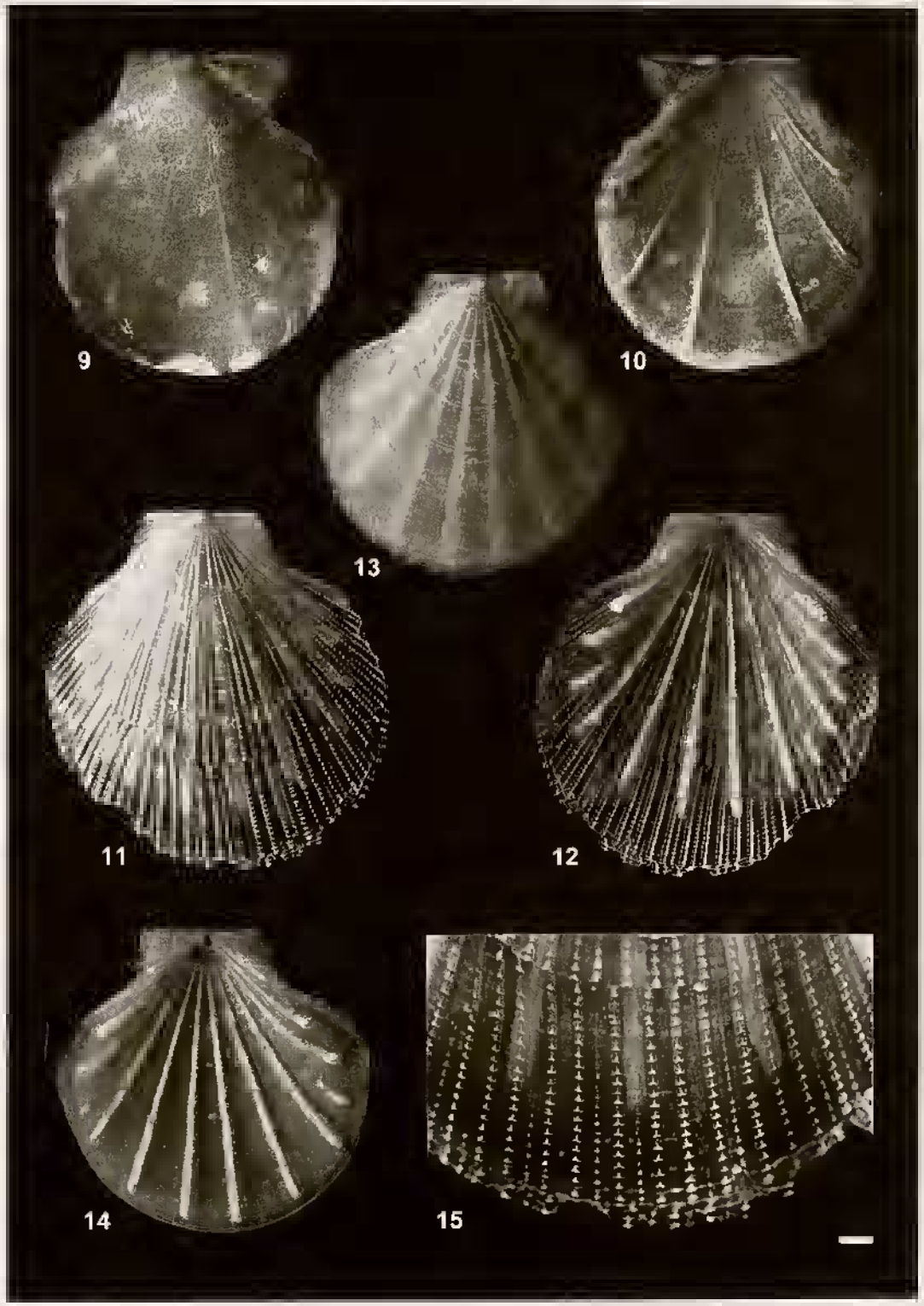
Figs 16-19

Parvamussium (Parvamussium) rubrotinctum Oyama, 1951: 81, pl. 13, figs 8-10.
Propeamussium rubrotinctum - DIJKSTRA, 1995b: 21, figs 23-26 [synonymy, reference, description].

MATERIAL EXAMINED. — **Indonesia**. KARUBAR, *Kai Islands:* stn DW 32, 05°47'S, 132°38'E, 307-311 m, 1 lv. — Stn CP 36, 06°05'S, 132°44'E, 210-268 m, 11 spms, 1 lv.

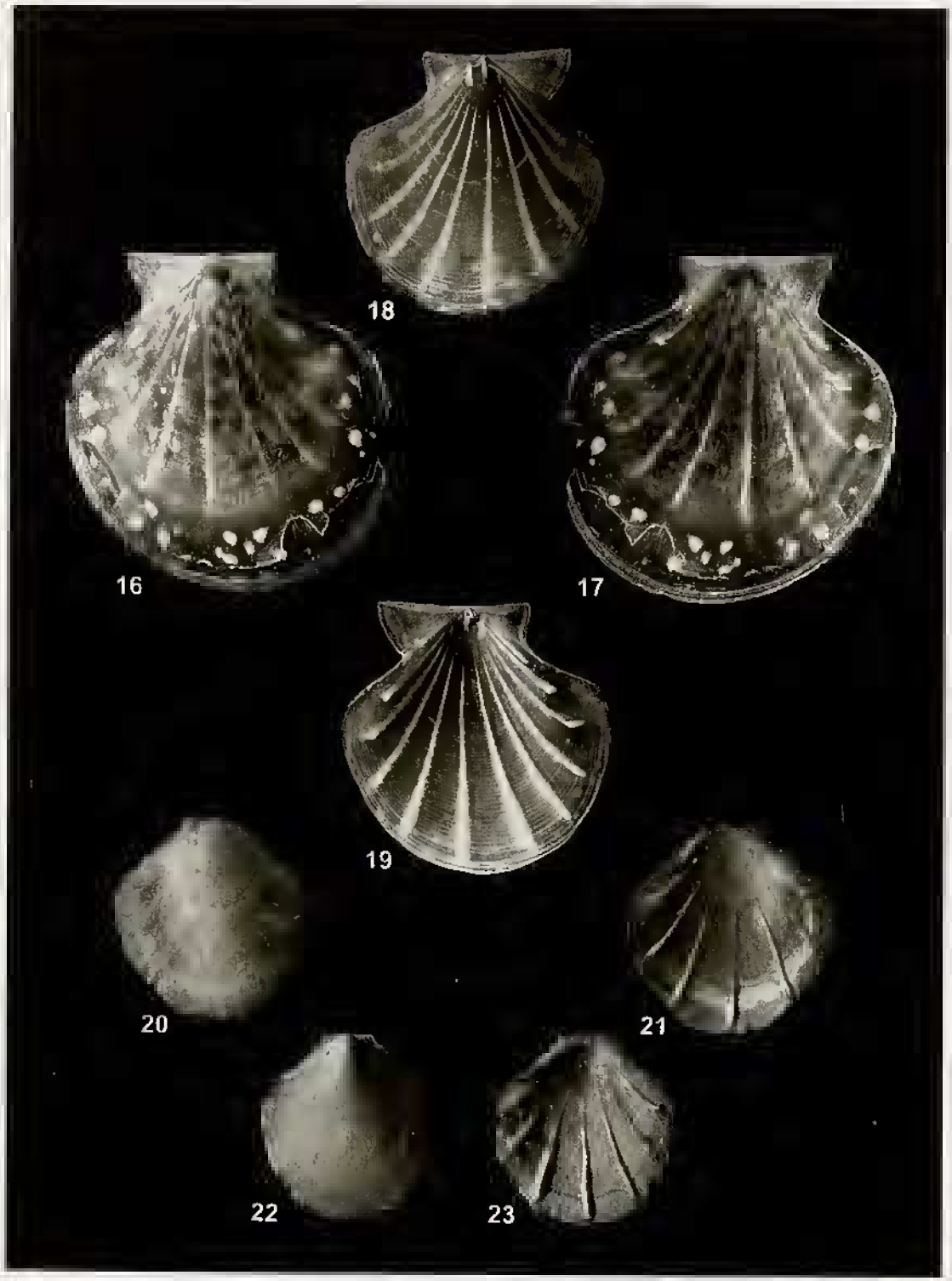
DISTRIBUTION. — Japan, South China Sea, New Caledonia, and the Loyalty Islands (DIJKSTRA, 1995b: 21); new record for Indonesia. Present material alive in 210-268 m.

REMARKS. — The present specimens are similar to OYAMA's description, but the figured specimen is somewhat more orbicular and has intercalated rudimentary riblets. OYAMA reported other specimens lacking intercalated riblets, just as in the present material.



FIGS 9-10. — *Propeamussium* sp. cf. *ina* (Dautzenberg & Bavay, 1912), KARUBAR, stn DW 31, 10.0 x 9.2 mm (rv) : **9**, right valve, exterior; **10**, right valve, interior.

FIGS 11-15. — *P. investigatoris* (E.A. Smith, 1906), KARUBAR, stn CP 09, 24.8 x 23.4 mm (db): **11**, left valve, exterior; **12**, left valve, interior; **13**, right valve, exterior; **14**, right valve, interior; **15**, left valve, exterior, ventral marginal detail, scale bar 1 mm.



FIGS 16-19. — *Propeamussium rubrotinctum* (Oyama, 1951), KARUBAR, stn CP 36, 17.9 x 17.0 mm (db): **16**, left valve, exterior; **17**, left valve, interior; **18**, right valve, exterior; **19**, right valve, interior.

FIGS 20-23. — *P. siratama* (Oyama, 1951), KARUBAR, stn DW 13, 12.1 x 12.0 mm (lv), 11.3 x 10.9 (rv): **20**, left valve, exterior; **21**, left valve, interior; **22**, right valve, exterior; **23**, right valve, interior.

Propeamussium sibogai (Dautzenberg & Bavay, 1904)

Figs 24-29

Amussium sibogai Dautzenberg & Bavay, 1904: 207, figs 1-4.
Propeamussium sibogai - DIJKSTRA, 1995b: 23, figs 19-22 [synonymy, references, description].

MATERIAL EXAMINED. — The type material (see DIJKSTRA, 1995b: 23).
Indonesia. KARUBAR, *Kai Islands*: stn DW 07, 05°46'S, 132°21'E, 283-285 m, 1 rv (fragment). — Stn CP 36, 06°05'S, 132°44'E, 210-268 m, 5 spms.

DISTRIBUTION. — South Africa, Japan, Philippines, Indonesia, NW Australia, New Caledonia, Loyalty Islands (DIJKSTRA, 1995b: 23). Present material alive in 210-268 m.

REMARKS. — The present material is very similar to the holotype from the Bali Sea. *P. watsoni* (E.A. Smith, 1894) differs by having a fine radiating sculpture in early growth stage and fine, closely spaced concentric lamellae on the left valve, more numerous (10-14) and not so broad internal ribs. *P. alcocki* (E.A. Smith, 1894) differs by having a more oval shape, a more fragile shell, and 11-12 narrower internal ribs. *P. andamanicum* (E.A. Smith, 1894) differs in its more oval shape, and its 9-10 shorter and narrower internal ribs. *P. sewelli* (Knudsen, 1967), from eastern Africa, differs by having a fine radiating and concentric sculpture on the left valve, and 11 narrower internal ribs. All these species are whitish transparent.

Propeamussium siratama (Oyama, 1951)

Figs 20-23

Ctenamusium (Micramussium) siratama Oyama, 1951: 80, pl. 13, figs 5-7.
Propeamussium (Propeamussium) siratama - DIJKSTRA, 1990: 2, pl. 1, figs 3-4.
Parvamussium siratama - ROMBOUTS, 1991: 70.

MATERIAL EXAMINED. — **Indonesia**. KARUBAR, *Kai Islands*: stn CP 09, 05°46'S, 132°21'E, 283-285 m, 2 spms. — Stn DW 13, 05°26'S, 132°38'E, 417-425 m, 2 lv, 5 rv. — Stn DW 28, 05°31'S, 132°54'E, 448-467 m, 1 lv.

TYPE MATERIAL. — Holotype (H 7.4, L 7.5, D 2.8 mm) possible in the OYAMA collection at Toba Aquarium, Japan [not seen].

TYPE LOCALITY. — Off Manazuruzaki, Sagami Sea, Japan, 234-291 m.

DISTRIBUTION. — Western Pacific from Japan to Indonesia, 234-467 m; present specimens alive in 283-285 m.

DESCRIPTION. — *Shell* small, up to *ca.* 12 mm high, fragile, orbicular, nearly equivalve, equilateral, slightly convex, auricles equal, umbonal angle 110-115°. *Prodissoconch ca.* 200 µm in height. *Left valve* sculptured with fine, irregularly spaced radial lirae from early growth stage until beyond central part of disc, with microscopic regularly spaced concentric lamellae, smooth central part and periphery. Auricles frequently smooth, sometimes with fine concentric lirae. *Right valve* sculptured with fine, regularly spaced concentric lirae, more prominent near ventral margin. Inner surface with 9-10 ribs, sometimes with one rudimentary intercostal one. Hinge line straight. No byssal fasciole, or byssal notch. Ctenolium absent. Colour whitish or pale-brown transparent.

REMARKS. — The present specimens fit the original description, but they reach a larger size, have fewer (9) internal ribs and lack the very fine concentric lamellae on the left valve. A somewhat similar species is *P. malpelouium* (Dall, 1908), from tropical eastern Pacific off Colombia, which differs by a coarser and more developed microsculpture on the left valve, and more numerous (11) internal ribs. *P. malpelouium* is only recorded from abyssal depths, 2690-4505 m (GRAU, 1959: 14).

FIGS 24-29. — *Propeamussium sibogai* (Dautzenberg & Bavay, 1904), KARUBAR, stn CP 36, 49.1 x 52.1 mm (db) : **24**, left valve, exterior; **25**, left valve, interior; **26**, right valve, exterior; **27**, right valve, interior; **28**, left valve, detail internal costa, scale bar 1 mm; **29**, right valve, detail internal costa, scale bar 1 mm.

Genus *PARVAMUSSIUM* Sacco, 1897

Parvamussium araneum Dijkstra, 1991

Figs 30-38

Parvamussium araneum Dijkstra, 1991: 8, figs 3-10.

MATERIAL EXAMINED. — The type material (see below).
Indonesia. KARUBAR, *Kai Islands*: stn DW 18, 05°18'S, 133°01'E, 205-212 m, 5 lv, 2 rv. — Stn DW 31, 05°40'S, 132°51'E, 288-289 m, 1 rv. — Stn CP 34, 06°09'S, 132°41'E, 435-445 m, 2 lv.
Tanimbar Islands: stn DW 49, 08°00'S, 132°59'E, 206-210 m, 1 lv, 1 rv.

TYPE MATERIAL. — Holotype RMNH 56531, live taken.

TYPE LOCALITY. — SNELLIUS-II, stn 4.060, 9°51.8'S, 120°46.4'E, NE coast of Sumba, E of Melolo, 240 m.

DISTRIBUTION. — Indonesia, shells in 155-435 m, alive in 240-300 m.

REMARKS. — The present specimens are alike the type material, but on the left valve the commarginal lamellae are more irregularly spaced.

Parvamussium carbaseum Dijkstra, 1991

Figs 39-43

Parvamussium carbaseum Dijkstra, 1991: 9, figs 11-21.
Parvamussium sp. Kase & Hayami, 1992: 448. — HAYAMI & KASE, 1993: 3, fig. 5.
Parvamussium crypticum Hayami & Kase, 1993: 54, figs 173-181. Syn. nov.

MATERIAL EXAMINED. — The type material (see below).
Indonesia. KARUBAR, *Kai Islands*: stn DW 29, 05°36'S, 132°56'E, 181-184 m, 2 rv.

TYPE MATERIAL. — *Parvamussium carbaseum*: holotype RMNH 56534. — *P. crypticum*: holotype UMUT RM 19451a.

TYPE LOCALITY. — *Parvamussium carbaseum*: SNELLIUS-II, stn 4.031, 5°54'S, 123°58.4'E, Tukang Besi Islands, Banda Sea, Indonesia, 390 m. — *P. crypticum*: "Shodokutsu" (= small cave) of Ie Islet, 26°42.9'N, 127°50.1'E, Okinawa, Ryukyu Islands, Japan, alive, 7-20 m.

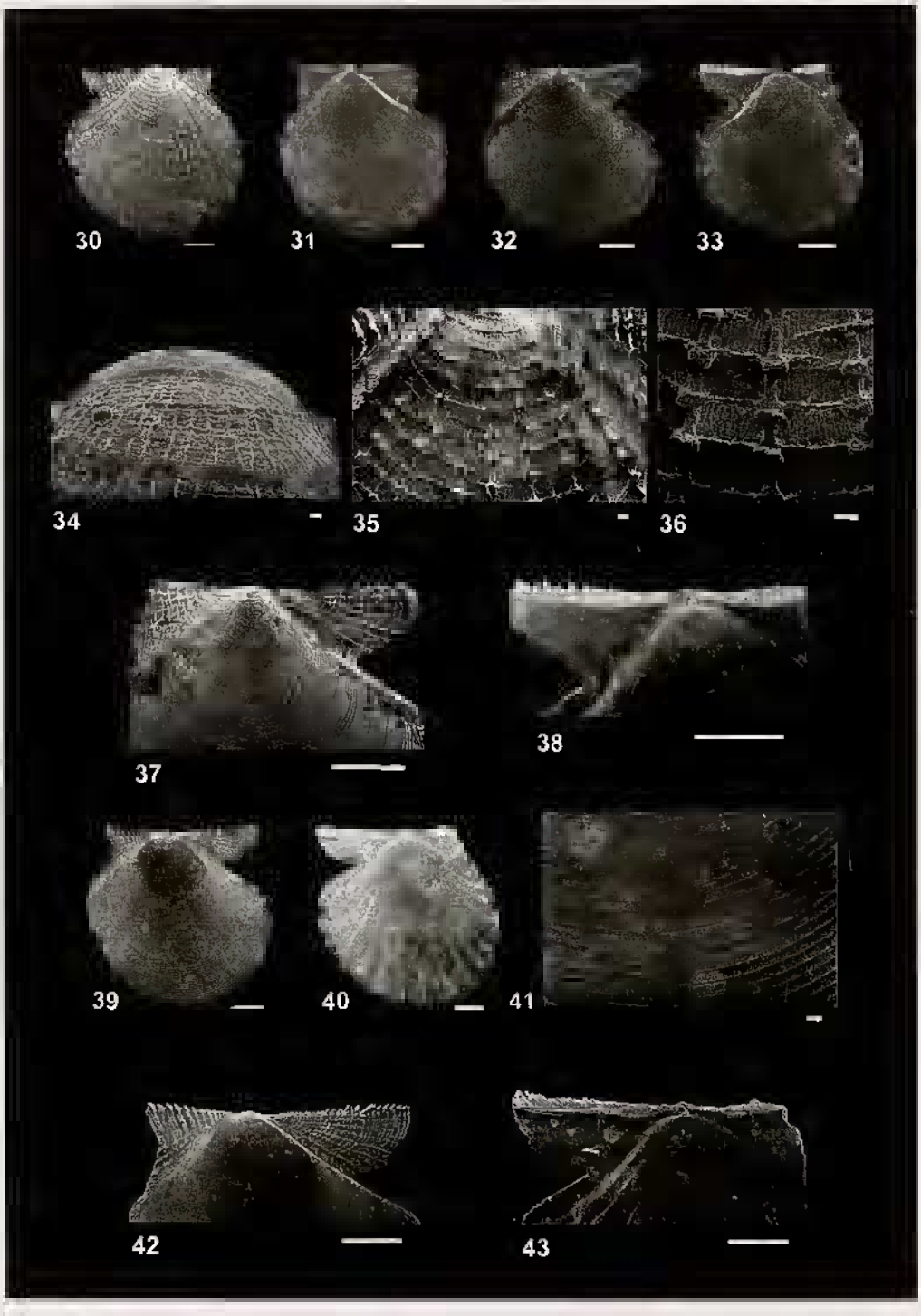
DISTRIBUTION. — Okinawa, alive in 7-20 m; eastern Indonesia, shells in 155-495 m.

REMARKS. — The present specimens are similar to the type material of *P. carbaseum*, and differ by their larger size, up to *ca.* 5 mm high, and by having a few more rudimentary intercostal riblets. HAYAMI & KASE (1993: 56) stated that *P. crypticum* differs from by "the byssal notch decidedly deeper, and the ratio of length/height a little larger...". However, similar features are observed in the present material and *P. crypticum* is here synonymized. *P. araneum* Dijkstra, 1991, differs from *P. carbaseum* by having a larger size, a latticed sculpture, and by having fewer (only a few rudimentary) internal ribs. *P. texturatum* (Dautzenberg & Bavay, 1912) differs in external sculpture, which is more prominent with lamellose radial costae and more widely spaced fine commarginal lamellae.

Parvamussium cassium Dijkstra, 1991

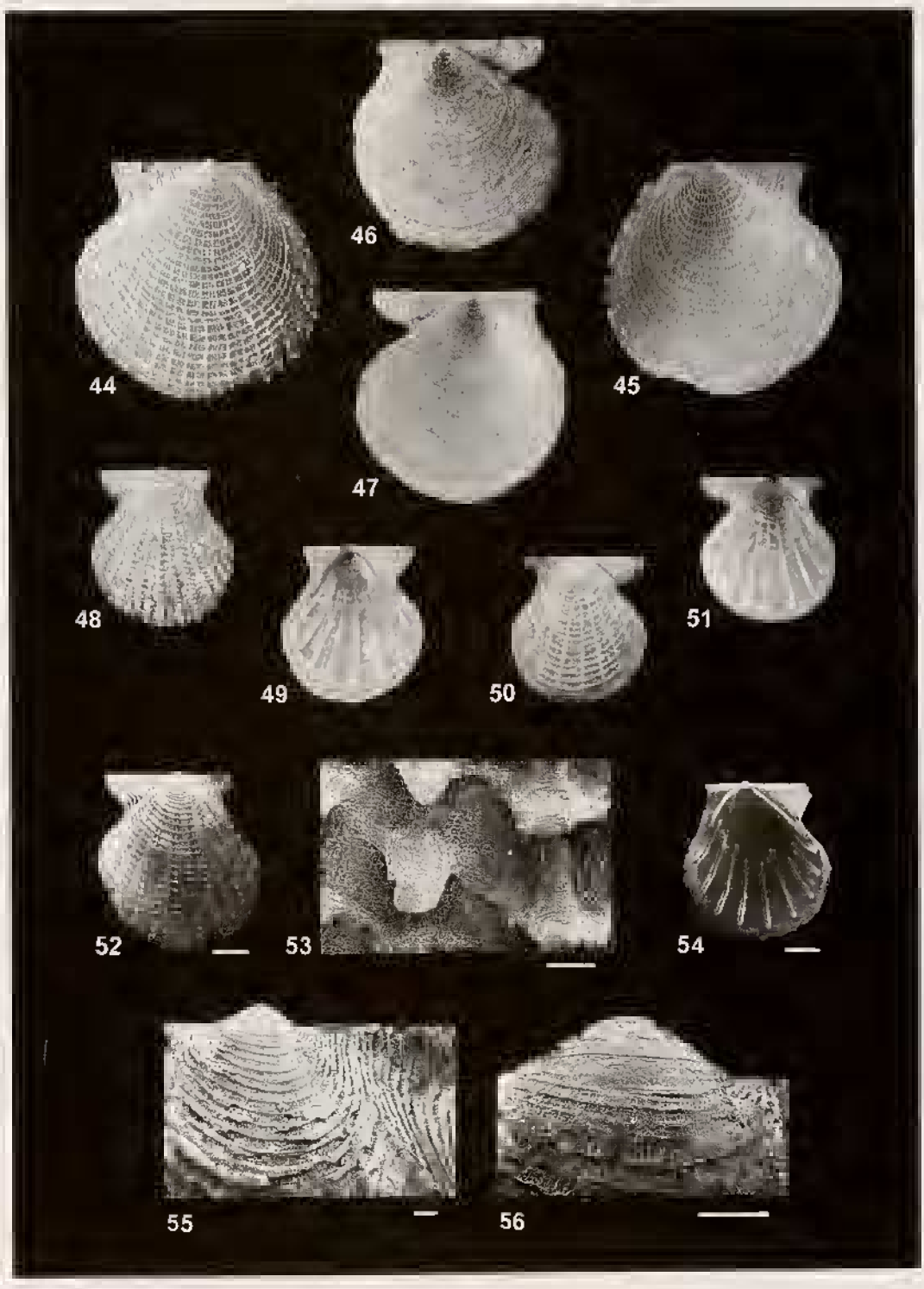
Figs 44-47

Parvamussium cassium Dijkstra, 1991: 11, figs 22-27.



FIGS 30-38. — *Parvamussium araneum* Dijkstra, 1991, KARUBAR, stn DW 18: **30**, left valve, exterior, scale bar 1 mm; **31**, left valve, interior, scale bar 1 mm; **32**, right valve, exterior, scale bar 1 mm; **33**, right valve, interior, scale bar 1 mm; **34**, left valve, prodissoconch, dissoconch, preradial stage, scale bar 10 µm; **35**, left valve, exterior, central detail, scale bar 100 µm; **36**, left valve, exterior, central detail, scale bar 100 µm; **37**, right valve, exterior, anterior and posterior auricles, scale bar 1 mm; **38**, right valve, interior, dorsal marginal detail, scale bar 1 mm.

FIGS 39-43. — *P. carbaseum* Dijkstra, 1991, KARUBAR, stn DW 29: **39**, right valve, exterior, scale bar 1 mm; **40**, right valve, interior, scale bar 1 mm; **41**, right valve, central detail, scale bar 100 µm; **42**, right valve, anterior and posterior auricles, scale bar 1 mm; **43**, right valve, interior, dorsal marginal detail, scale bar 1 mm.



FIGS 44-47. — *Parvamussium cassium* Dijkstra, 1991, KARUBAR, stn CP 05, 8.0 x 7.8 mm (db): **44**, left valve, exterior; **45**, left valve, interior; **46**, right valve, exterior; **47**, right valve, interior.

FIGS 48-56. — *P. conspectum* sp. nov., KARUBAR, stn DW 15: **48-51**, holotype, 5.1 x 4.7 mm (db): **48**, left valve, exterior; **49**, left valve, interior; **50**, right valve, exterior; **51**, right valve, interior. — **52-56**, paratype: **52**, left valve, exterior, scale bar 1 mm; **53**, left valve, antero-marginal detail, scale bar 100 µm; **54**, left valve, interior, scale bar 1 mm; **55**, left valve, exterior, preradial stage, scale bar 100 µm; **56**, left valve, exterior, dissoconch, preradial stage, scale bar 100 µm.

MATERIAL EXAMINED. — The type material (see below).
Indonesia. KARUBAR. *Kai Islands*: stn CP 05, 05°49'S, 132°18'E, 296-299 m, 1 spm.

TYPE MATERIAL. — Holotype RMNH 56549, live taken.

TYPE LOCALITY. — SNELLIUS-II, stn 4.142, 6°29.7'S, 121°10.8'E, NE Taka Bone Rate (Tiger Island), E of Tarupa Kecil, 450-600 m.

DISTRIBUTION. — Flores Sea and Banda Sea, Indonesia; alive in 299-450 m.

REMARKS. — The present specimen is similar to the type material, although more orbicular in shape, with fewer secondary radial riblets on the left valve and the small scales on the intersections are slightly more prominent. Other conchological features are identical.

Parvamussium conspectum sp. nov.

Figs 48-61

Parvamussium sp. cf. *texturatum* - DIJKSTRA, 1991: 17, figs 44-52.

MATERIAL EXAMINED. — **Indonesia**. KARUBAR, *Kai Islands*: stn DW 02, 05°47'S, 132°13'E, 209-240 m, 1 lv (paratype POLIPI), 2 rv (paratypes HD, POLIPI). — Stn DW 15, 05°17'S, 132°41'E, 212-221 m, 1 spm. (holotype), 2 lv, 2 rv (paratypes MNHN) — Stn DW 18, 05°18'S, 133°01'E, 205-212 m, 1 lv (paratype HD). — Stn DW 24, 05°32'S, 132°51'E, 230-243 m, 2 lv (paratypes MNHN).

TYPE MATERIAL. — Holotype, live taken, MNHN. Paratypes: 2 HD, 2 POLIPI, 5 MNHN.

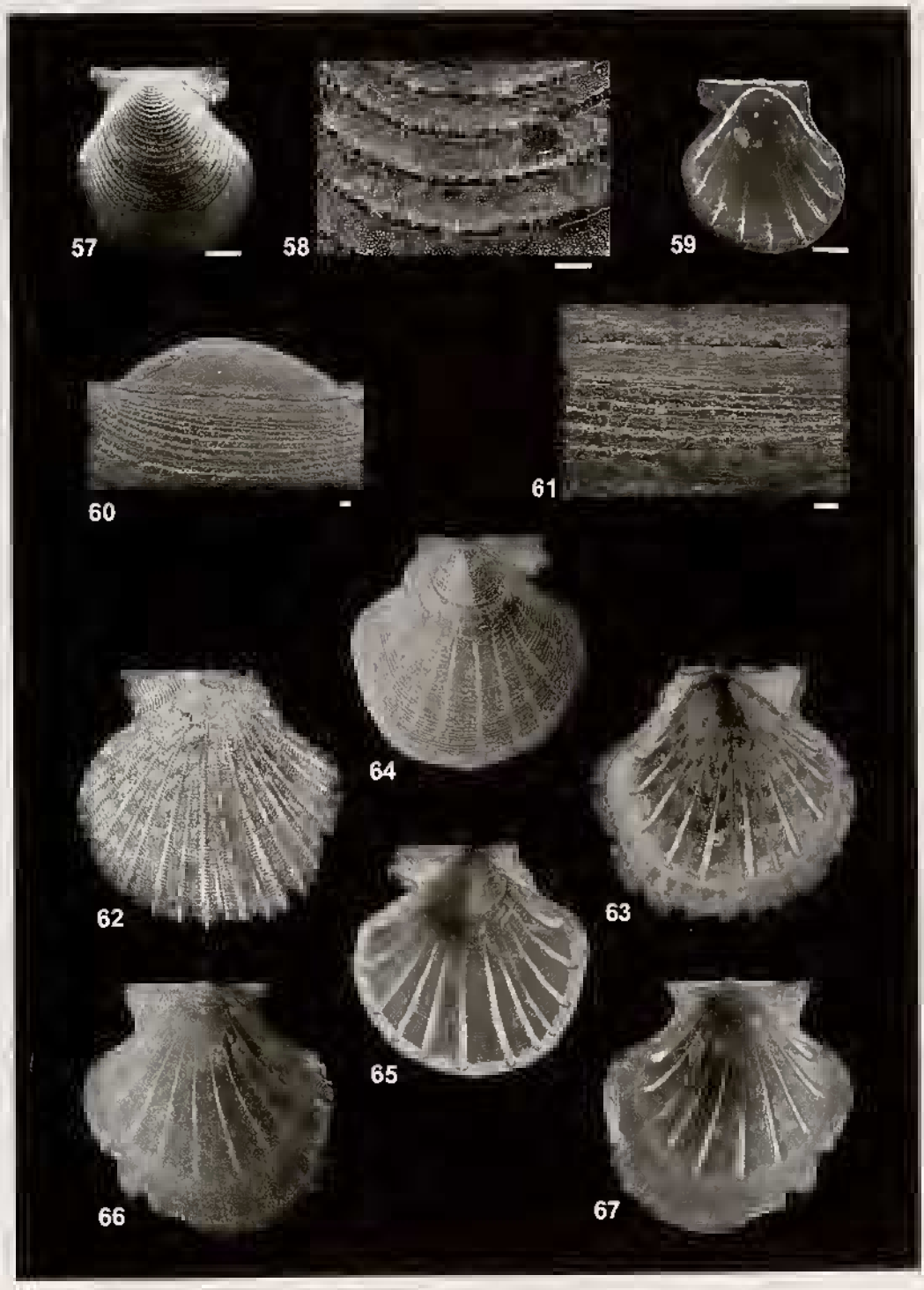
TYPE LOCALITY. — Kai Islands, E Indonesia, KARUBAR, stn DW 15, 050°17'S, 132°41'E, 212-221 m.

DISTRIBUTION. — Eastern Indonesia; shells in 100-290 m, alive in 212-250 m.

DESCRIPTION. — *Shell* small, up to *ca.* 5 mm high, fragile, semi-transparent, valves equally convex, elongate, inequivalve, slightly inequilateral, auricles unequal in size, umbonal angle *ca.* 90°. *Prodissoconch ca.* 190 µm in height. *Left valve* sculptured with *ca.* 20 primary and secondary irregularly spaced radial riblets, *ca.* 10 closely set commarginal lamellae in early growth stage (before pre-radial stage), widely spaced on central part of disc and more closely so towards ventral margin. Intersections of radial riblets and commarginal lamellae strongly squamous. Anterior auricle larger than posterior and provided with closely spaced, strongly irregularly developed concentric lamellae, more prominent anteriorly. A row of small lamellae produced near disc flank. *Right valve* sculptured with *ca.* 20 widely spaced concentric lamellose lirae. Sculpture of auricles similar to that of left valve. A radial lira on anterior auricle near byssal faseiole. Internal ribs 9, commencing 1 mm below resilifer and developed towards 0.5 mm above periphery, with a small auricular riblet on each side. Hinge line straight. Resilifer triangular. Byssal fasciole and notch small. Ctenolium absent. Left valve creamy-orange, right valve transparent white. Inner side of both valves glossy. Dimensions (holotype): H 5.1, L 4.7, D 1.1 mm.

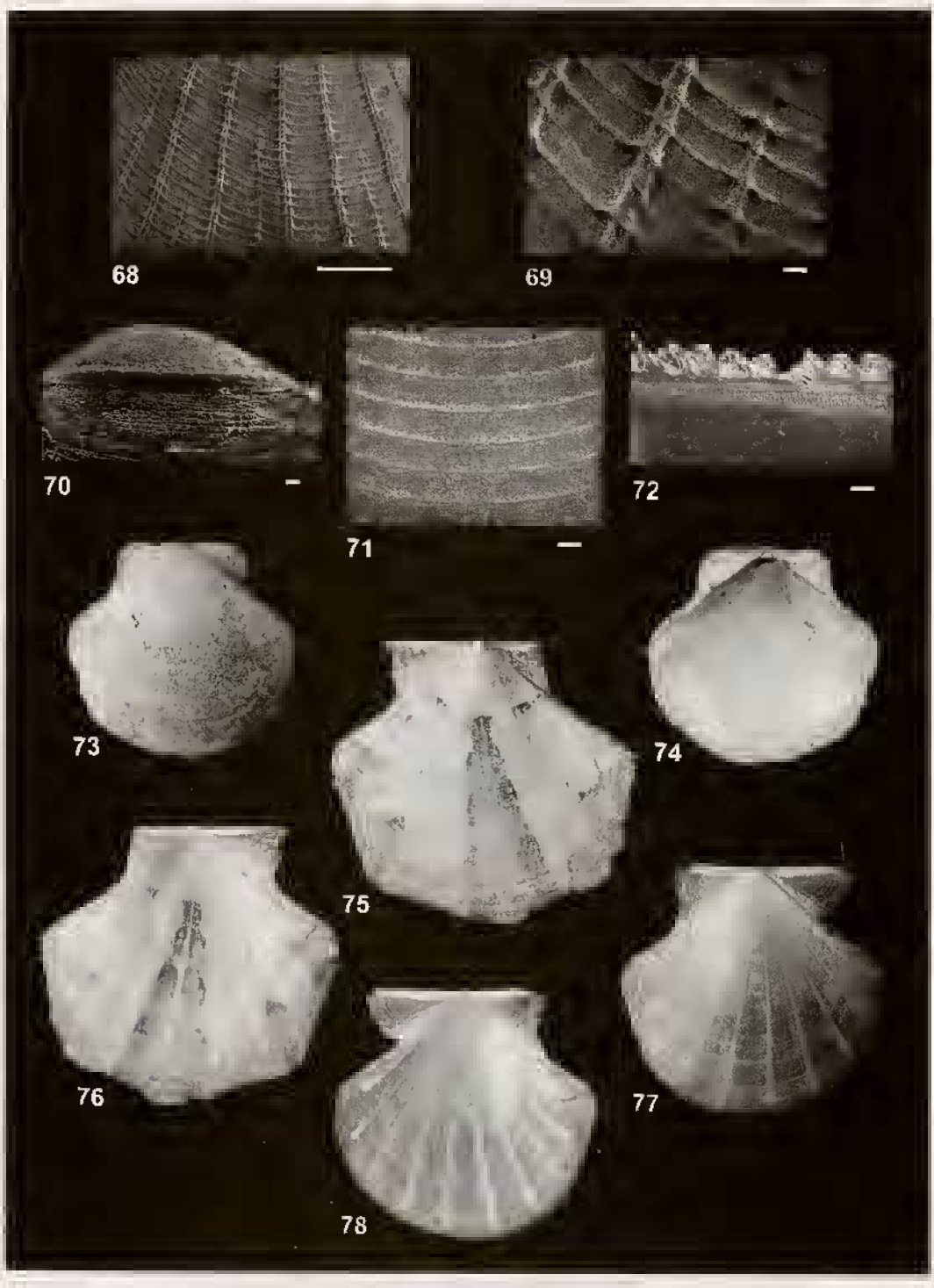
REMARKS.— *Parvamussium* sp. cf. *texturatum* of DIJKSTRA (1991: 17, figs 44-52) differs from the present material only in the internal ribs being shorter and slightly more numerous (10 instead of 9). *P. texturatum* (Dautzenberg & Bavay, 1912) differs by having a more orbicular shape, a weaker sculpture of commarginal lamellae on the left valve, and in having more numerous internal ribs (15). *P. vesiculatum* Dijkstra, 1995, differs by having a more nodose sculpture at intersections on the left valve, more numerous closely spaced concentric lamellae on the right valve, and less developed internal riblets (only a few rudimentary near the anterior and posterior margins). *P. undisonum* Dijkstra, 1995 differs in size (larger, up to *ca.* 14 mm), is more oblique, and more weakly sculptured with more close-set commarginal lamellae on the left valve.

ETYMOLOGY. —Lat. *conspectus*, adj. = conspicuous.



FIGS 57-61. — *Parvamussium conspectum* sp. nov., KARUBAR, stn DW 15, paratype (MNHN): **57**, right valve, exterior, scale bar 1 mm; **58**, right valve, exterior, central detail, scale bar 100 µm; **59**, right valve, interior, scale bar 1 mm; **60**, right valve, exterior, prodissoconch, dissoconch, preradial stage, scale bar 10 µm; **61**, right valve, exterior, dissoconch, preradial stage, scale bar 10 µm.

FIGS 62-67. — *P. cristatellum* Dautzenberg & Bavay, 1912, KARUBAR, stn DW 13, 8.4 x 8.9 mm (lv, typical), 8.3 x 8.1 mm (lv, atypical), 7.8 x 7.8 mm (rv): **62**, left valve, exterior; **63**, left valve, interior; **64**, right valve, exterior; **65**, right valve, interior; **66**, left valve (atypical), exterior; **67**, left valve (atypical), interior.



FIGS 68-72. — *Parvamussium cristatellum* Dautzenberg & Bavay, 1912, KARUBAR, stn DW 13: **68**, left valve, exterior, central detail, scale bar 1 mm; **69**, left valve, exterior, antero-ventral detail, scale bar 100 µm; **70**, left valve, exterior, prodissoconch, dissoconch, preradial stage, scale bar 10 µm; **71**, right valve, exterior, central detail, scale bar 100 µm; **72**, right valve, interior, antero-dorsal detail, scale bar 100 µm.

FIGS 73-74. — *P. pauciliratum* (E.A. Smith, 1903), KARUBAR, stn DW 28, 7.0 x 7.5 mm (rv): **73**, right valve, exterior; **74**, right valve, interior.

FIGS 75-78. — *P. scitulum* (E.A. Smith, 1885), KARUBAR: stn DW 22, 9.1 x 9.8 mm (lv), 7.8 x 8.0 mm (rv): **75**, left valve, exterior; **76**, left valve, interior; **77**, right valve, exterior; **78**, right valve, interior.

Parvamussium cristatellum (Dautzenberg & Bavay, 1912)

Figs 62-72

Pecten (Amussium) cristatum (*sic*) Bavay, 1905b: 187, pl. 17, figs 2a-c (*non Pecten cristatus* Bronn, 1828).
Amussium cristatellum Dautzenberg & Bavay, 1912: 36, pl. 28, figs 5-8 [*nom. nov.* for *Pecten (Amussium) cristatus* Bavay].
Parvamussium cristatellum - DIJKSTRA, 1991: 13, figs 28-32 [synonymy, references, description, discussion].

MATERIAL EXAMINED. — The type material (see below).
Indonesia. KARUBAR, *Kai Islands*: stn DW 13, 05°26'S, 132°38'E, 417-425 m, 20 lv, 20 rv. — Stn DW 14, 05°18'S, 132°38'E, 245-246 m, 1 lv. — Stn DW 18, 05°18'S, 133°01'E, 205-212 m, 3 lv, 7 rv. — Stn DW 28, 05°33'S, 132°51'E, 304-314 m, 4 lv, 5 rv. — Stn DW 29, 05°36'S, 132°56'E, 181-184 m, 4 lv. — Stn DW 32, 05°47'S, 132°51'E, 170-206 m, 3 lv, 1 rv. — Stn CP 34, 06°09'S, 132°41'E, 435-445 m, 4 lv.
Taninbar Islands: stn CP 65, 09°14'S, 132°27'E, 174-176 m, 4 lv, 5 rv. — Stn CP 69, 08°42'S, 131°53'E, 356-368 m, 8 lv, 8 rv.

TYPE MATERIAL. — Lectotype (lv illustrated by BAVAY, 1905b, pl. 17, fig. 2a; H 7.1, L 7.2 mm) ZSI M3360/1, here designated. Two paralectotypes (BAVAY, 1905b, pl. 17, figs 2b-c) ZSI M3360/2-3.

TYPE LOCALITY. — *"Masandam insulam"* [= Andaman Islands, India], depth unknown.

DISTRIBUTION. — Northeastern Indian Ocean and Indonesia.

REMARKS. — The present specimens are similar to the type material. The internal ribbing and sculpture are variable, from weak to more prominent, sometimes lacking sculpture or commarginal lamellae on the left valve. *P. thetidis* somewhat differs by having a weaker sculpture and more close-set commarginal lamellae on the left valve. *P. siebenrocki* (Sturany, 1901) from the northwestern Indian Ocean is nearly identical to *P. cristatellum*, and differs only in the radial costae on the left valve being somewhat weaker; however, intermediates seem to exist and the two may be synonyms. *P. formosum* (Melvill, 1907) from the western Indian Ocean is quite smooth and the auricles are very finely sculptured and more similar to those in *P. torresi* (E.A. Smith, 1885).

Parvamussium pauciliratum (E.A. Smith, 1903)

Figs 73-74

Amussium pauciliratum (*sic*) E.A. Smith, 1903: 622, pl. 36, figs 23-24.
Parvamussium pauciliratum - DIJKSTRA, 1995b: 26, figs 107-110, 151-152 [references, description].

MATERIAL EXAMINED. — The type material (see DIJKSTRA, 1995b: 28).
Indonesia. KARUBAR, *Kai Islands*: stn DW 28, 05°31'S, 132°54'E, 448-467 m, 1 rv.

DISTRIBUTION. — Northern Indian Ocean, Indonesia to New Caledonia; 27-448 m, alive in 27-45 m.

REMARKS. — The present specimen is very similar to the type material, although the internal ribs are somewhat more prominent. However, development of internal ribs is variable (very weak and small to strongly developed). Juveniles often lack the internal ribs.

Parvamussium scitulum (E.A. Smith, 1885)

Figs 75-78

Amussium scitulum E.A. Smith, 1885: 312, pl. 23, figs 4-4b.
Parvamussium scitulum - DIJKSTRA, 1995b: 31, figs 43-46, 153-154 [synonymy, references, description, discussion].

MATERIAL EXAMINED. — The type material (see DIJKSTRA, 1995b: 31).
Indonesia. KARUBAR, *Kai Islands*: stn CP 05, 05°49'S, 132°18'E, 296-299 m, 1 lv. — Stn DW 22, 05°22'S, 133°01'E, 124-850 m, 7 lv, 16 rv. — Stn DW 30, 05°39'S, 132°56'E, 111-118 m, 3 lv, 9 rv. — Stn DW 31, 05°40'S, 132°51'E, 288-289 m, 1 lv.

DISTRIBUTION. — Western and southwestern Pacific from Japan to New Caledonia; 50-300 m, with shells occasionally carried deeper, present material (shells only) in 118-296 m.

REMARKS. — The present specimens are similar to the type material, and reach a larger size, up to 10 mm. In *P. dautzenbergi* Dijkstra, 1990, also from Indonesia, the left valve is more prominently reticulated.

Parvamussium squalidulum Dijkstra, 1995

Figs 79-82

Parvamussium squalidulum Dijkstra, 1995b: 32, figs 47-50.

MATERIAL EXAMINED. — The type material (see DIJKSTRA, 1995b: 32).
Indonesia. KARUBAR, *Kai Islands*: stn DW 02, 05°47'S, 132°13'E, 209-240 m, 3 lv, 6 rv. — Stn DW 22, 05°22'S, 133°01'E, 124-850 m, 1 lv.

DISTRIBUTION. — Coral Sea to New Hebrides Arc, alive in 260-400 m; new record for Indonesia.

REMARKS. — The material from stn DW 02 differs slightly in sculpture. Concentric lamellae are somewhat more widely spaced on both valves and scales on riblets are weaker.

Parvamussium thetidis (Hedley, 1902)

Figs 83-89

Amusium thetidis Hedley, 1902: 304, fig. 49.
Parvamussium thetidis - DIJKSTRA, 1995b: 35, figs 99-102 [synonymy, references, description, discussion].

MATERIAL EXAMINED. — The type material (see DIJKSTRA, 1995b: 35).
Indonesia. KARUBAR, *Kai Islands*: stn DW 24, 05°32'S, 132°51'E, 230-243 m, 3 lv, 2 rv. — Stn DW 28, 05°31'S, 132°54'E, 448-467 m, 1 lv. — Stn DW 31, 05°40'S, 132°51'E, 288-289 m, 1 lv, 8 rv.
Taniubar Islands: stn CP 77, 08°57'S, 131°27'E, 346-352 m, 1 spm.

DISTRIBUTION. — Eastern Australia, Coral Sea to New Hebrides Arc; new record for Indonesia. Present material alive in 346-352 m, shells in 243-448 m.

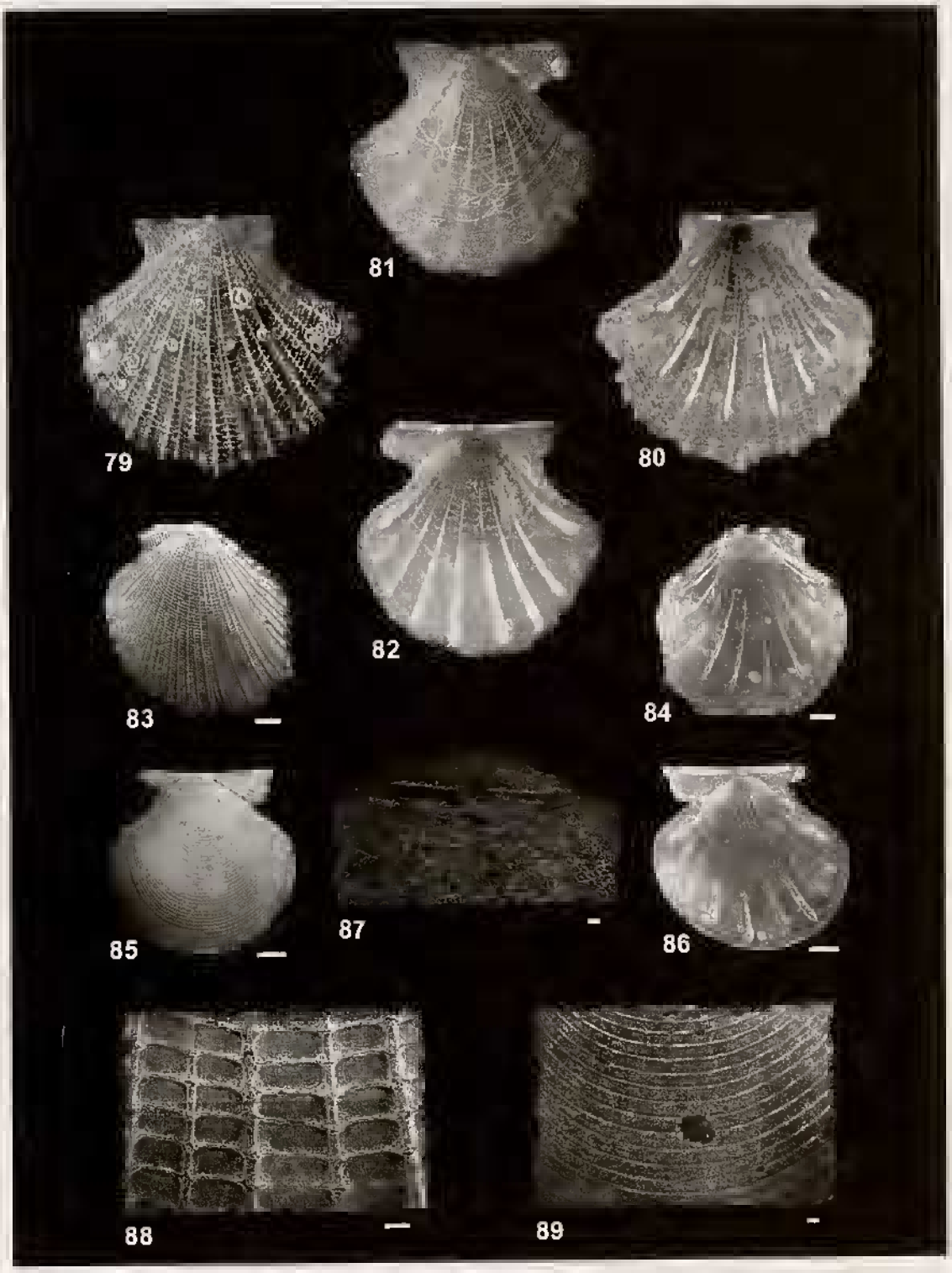
REMARKS. — The left valve of the specimen from stn CP 77 is slightly more prominently sculptured, with more numerous radial riblets and stronger commarginal lamellae.

Parvamussium torresi (E.A. Smith, 1885)

Figs 90-94

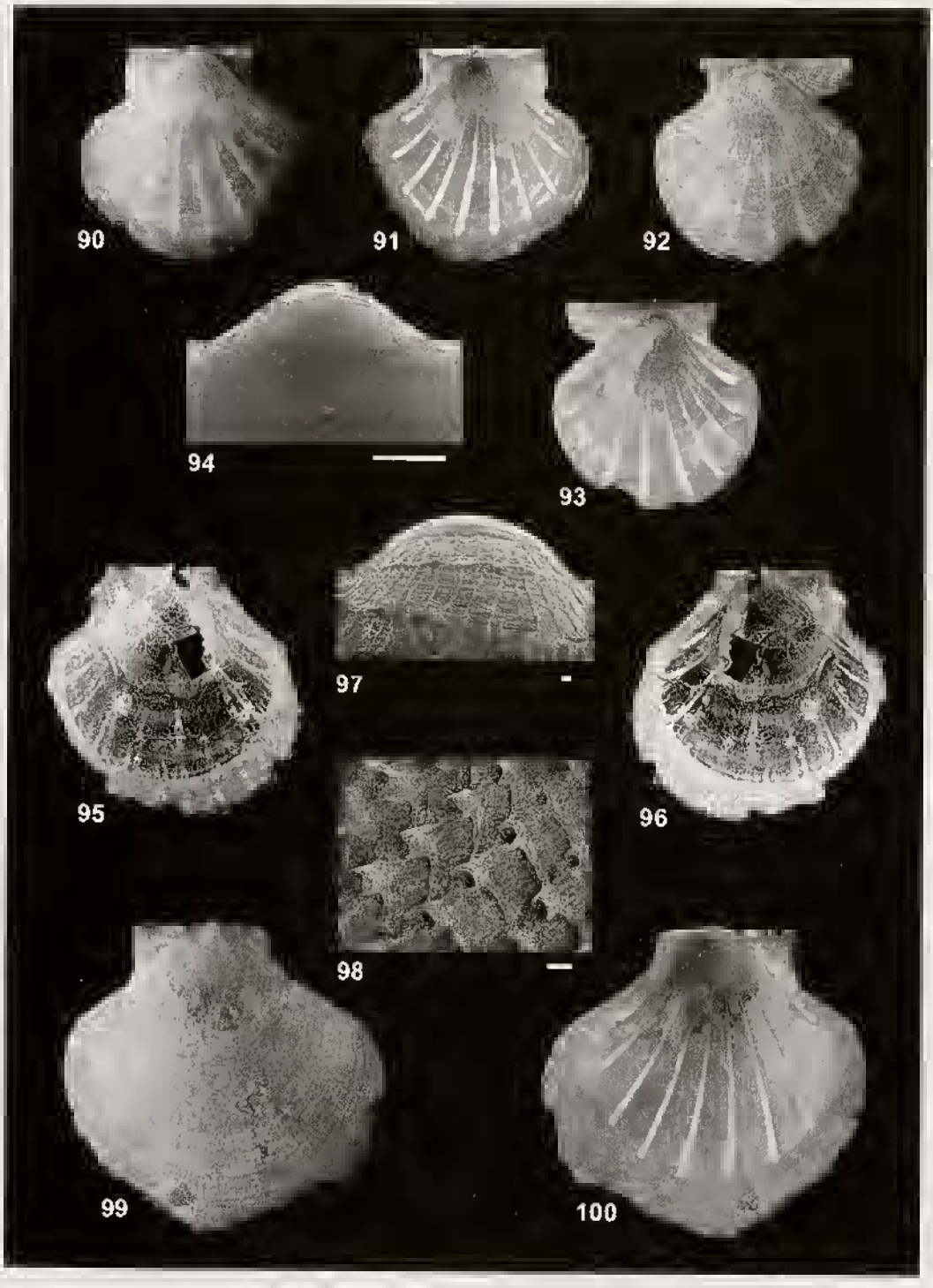
Amussium torresi E.A. Smith, 1885: 311, pl. 23, figs 3-3b.
Parvamussium torresi - DIJKSTRA, 1995b: 36, figs 51-54, 125-128 [references, description].

MATERIAL EXAMINED. — The type material (see DIJKSTRA, 1995b: 36).
Indonesia. KARUBAR, *Kai Islands*: stn DW 01, 05°46'S, 132°10'E, 156-305 m, 2 lv, 1 rv. — Stn DW 02, 05°47'S, 132°13'E, 209-240 m, 13 lv, 15 rv. — Stn DW 03, 05°48'S, 132°13'E, 278-301 m, 6 lv, 8 rv. — Stn DW 07, 05°46'S, 132°21'E, 283-285 m, 2 lv, 7 rv. — Stn DW 15, 05°17'S, 132°41'E, 212-221 m, 5 lv, 1 rv. — Stn DW 18, 05°18'S, 133°01'E, 205-212 m, 6 spms, 2 lv, 16 rv. — Stn DW 29, 05°36'S, 132°56'E, 181-184 m, 4 lv, 12 rv. — Stn DW 31, 05°40'S, 132°51'E, 288-289 m, 10 lv, 10 rv. — Stn DW 32, 05°47'S, 132°51'E, 170-206 m, 2 spms.



FIGS 79-82. — *Parvamussium squalidulum* Dijkstra, 1995, KARUBAR, stn DW 02, 8.2 x 8.9 mm (lv), 7.2 x 7.8 mm (rv): **79**, left valve, exterior; **80**, left valve, interior; **81**, right valve, exterior; **82**, right valve, interior.

FIGS 83-89. — *P. thetidis* (Hedley, 1902), KARUBAR, stn DW 31: **83**, left valve, exterior, scale bar 1 mm; **84**, left valve, interior, scale bar 1 mm; **85**, right valve, exterior, scale bar 1 mm; **86**, right valve, interior, scale bar 1 mm; **87**, left valve, exterior, prodissoconch, dissoconch, preradial stage, scale bar 10 µm; **88**, left valve, exterior, central detail, scale bar 100 µm; **89**, right valve, exterior, central detail, scale bar 100 µm.



FIGS 90-94. — *Parvamussium torresi* (E.A. Smith, 1885). KARUBAR, stn DW 02, 6.9 x 7.1 mm (lv), 6.3 x 6.3 mm (rv): **90**, left valve, exterior; **91**, left valve, interior; **92**, right valve, exterior; **93**, right valve, interior; **94**, left valve, exterior, prodissoconch, scale bar 100 µm.

FIGS 95-98. — *P. vesiculatum* Dijkstra, 1995: **95-96**, KARUBAR, stn DW 32, 7.9 x 8.1 mm (lv): **95**, left valve, exterior; **96**, left valve, interior. — **97-98**, KARUBAR, stn DW 18: **97**, left valve, exterior, dissoconch, preradial stage, scale bar 10 µm; **98**, left valve, exterior, antero-ventral detail, scale bar 100 µm.

FIGS 99-100. — *P. virgatum* Dijkstra, 1991, KARUBAR, stn DW 32, 10.0 x 10.2 mm (lv): **99**, left valve, exterior; **100**, left valve, interior.

DISTRIBUTION. — Southern Philippines, Indonesia, Coral Sea to the Loyalty Islands; 205-600 m, alive in 205-355 m.

REMARKS. — The present specimens are similar to the type material; a few specimens (stn DW 01 and DW 32) have colour maculations. *P. formosum* from the Arabian Sea is closely related but differs in having a more prominent sculpture of radial striae on auricles and near the anterior and posterior margins of the left valve. *P. scitulum* (E.A. Smith, 1885) differs from *P. torresi* by having a more compressed shell, more prominent sculpture of radial striae, and by being more brightly coloured. The right valve of *P. torresi* is covered with regularly spaced concentric lirae, which are generally lacking on *P. scitulum*.

Parvamussium vesiculatum Dijkstra, 1995

Figs 95-98

Parvamussium vesiculatum Dijkstra, 1995b: 37, figs 59-62, 93-96.

MATERIAL EXAMINED. — The type material (see DIJKSTRA, 1995b: 37).
Indonesia. KARUBAR, *Kai Islands*: stn DW 18, 05°18'S, 133°01'E, 205-212 m, 3 spms. — Stn DW 29, 05°36'S, 132°56'E, 181-184 m, 1 lv, 1 rv. — Stn DW 32, 05°47'S, 132°51'E, 170-206 m, 1 lv.

DISTRIBUTION. —New Caledonia and Loyalty Islands; new record for Indonesia. Present material alive in 205-212 m.

Parvamussium virgatum Dijkstra, 1991

Figs 99-100

Parvamussium virgatum Dijkstra, 1991: 20, figs 62-65.

MATERIAL EXAMINED. — The type material (see below).
Indonesia. KARUBAR, *Kai Islands*: stn DW 32, 05°47'S, 132°51'E, 170-206 m, 1 lv.

TYPE MATERIAL. — Holotype RMNH 56556.

TYPE LOCALITY. — Banda Sea, Tukang Besi Islands, NW of Binongko, SNELLIUS-II, stn 4.033, 05°52.5'S, 123°58.5'E, 250-290 m.

DISTRIBUTION. — Eastern Indonesia; shells in 206-305 m.

REMARKS. — The present specimen is similar to the type material. *P. scitulum* (E.A. Smith, 1885) differs by having a more compressed shell, and a stronger sculpture with radial and concentric lirae on the left valve; the auricles are also more prominent sculptured.

Family PECTINIDAE Wilkes, 1810
Subfamily CAMPTONECTINAE Habe, 1977

Genus ***DELECTOPECTEN*** Stewart, 1930

Delectopecten alcocki (E.A. Smith, 1904)

Figs 101-108

Pecten alcocki E.A. Smith, 1904: 13.
Delectopecten alcocki - DIJKSTRA, 1995b: 50, figs 111-114, 147-150 [references, description].

MATERIAL EXAMINED. — The type material (see DIJKSTRA, 1995b: 50).

Indonesia. KARUBAR, *Kai Islands*: stn CP 05, 05°49'S, 132°18'E, 296-299 m, 1 spm. — Stn DW 08, 05°20'S, 132°31'E, 358-360 m, 10 lv, 5 rv. — Stn CP 09, 05°23'S, 132°29'E, 68-389 m, 18 spms, 2 lv, 10 rv. — Stn CC 10, 05°21'S, 132°30'E, 329-389 m, 25 spms, 9 lv. 6 rv. — Stn DW 13, 05°26'S, 132°38'E, 417-425 m, 1 spm, 25 lv, 23 rv. — Stn CP 16, 05°17'S, 132°50'E, 315-349 m. 3 spms. — Stn CP 17, 05°15'S, 133°01'E, 439-459 m, 1 spm. — Stn DW 18, 05°18'S, 133°01'E, 205-212 m, 2 rv. — Stn CP 20, 05°15'S, 132°59'E, 769-809 m, 1 rv. — Stn CC 21, 05°14'S, 133°00'E, 688-694 m, 4 spms, 1 lv, 1 rv. — Stn DW 28, 05°31'S, 132°54'E, 448-467 m, 1 lv, 1 rv. — Stn DW 31, 05°40'S, 132°51'E, 288-289 m, 1 spm. — Stn CP 35, 06°08'S, 132°45'E, 390-502 m, 2 spms, 1 rv. — Stn CP 38, 07°40'S, 132°27'E, 620-666 m, 4 spms.

Tanimbar Islands: stn DW 44, 07°52'S, 132°48'E, 291-295 m, 1 lv, 3 rv. — Stn CC 56, 08°16'S, 131°59'E, 549-552 m, 1 spm. — Stn CC 58, 08°19'S, 132°02'E, 457-461 m, 2 spms, 1 lv. — Stn CP 59, 08°20'S, 132°11'E, 399-405 m, 3 spms, 4 lv, 5 rv. — Stn DW 60, 08°21'S, 132°14'E, 387-389 m, 5 lv, 2 rv, — Stn CP 63, 08°00'S, 132°58'E, 214-215 m, 1 rv. — Stn CP 65, 09°14'S, 132°27'E, 174-176 m, 8 spms, 22 lv, 23 rv. — Stn CP 69, 08°42'S, 131°53'E, 399-405 m, many spms. — Stn CP 71, 08°38'S. 131°44'E, 477-480 m, 1 lv.

DISTRIBUTION. — East Africa, Gulf of Aden, Bay of Bengal, Philippines, Indonesia, Coral Sea (DIJKSTRA, 1995b: 50). Present material alive in 176-688 m.

REMARKS. — The present specimens are similar to the type material, although somewhat more variable in sculpture (diverging radial striae very weak to more prominent and radially aligned scales absent to strongly developed). In the type material the diverging radial striae are almost lacking and the scales are weak.

Delectopecten fluctuatus (Bavay, 1905)

Figs 109-113

Pecten (Chlamys) fluctuatus Bavay, 1905b: 188, pl. 17, figs 3a-b.
Delectopecten fluctuatus - DIJKSTRA, 1995b: 51, figs 83-86 [references, description].

MATERIAL EXAMINED. — The type material (see DIJKSTRA, 1995b: 51).

Indonesia. KARUBAR, *Kai Islands*: stn DW 13, 05°26'S, 132°38'E, 417-425 m, 1 lv. — Stn DW 31, 05°40'S, 132°51'E, 288-289 m, 3 spms.

Tanimbar Islands: stn CP 86, 09°26'S, 131°13'E, 223-225 m, 2 spms.

DISTRIBUTION. — Andaman Sea, Indonesia. Loyalty Islands (DIJKSTRA, 1995b: 51). Present specimens alive in 225-288 m.

REMARKS. — Present specimens differ from the holotype in being semi-transparent white instead of opaque cream, and by having more numerous radial riblets, up to *ca.* 40-70, near the ventral margin.

Subfamily CHLAMYDINAE Teppner, 1922

Tribe CHLAMYDINI Teppner, 1922

Genus *LAEVICHLAMYS* Waller, 1993

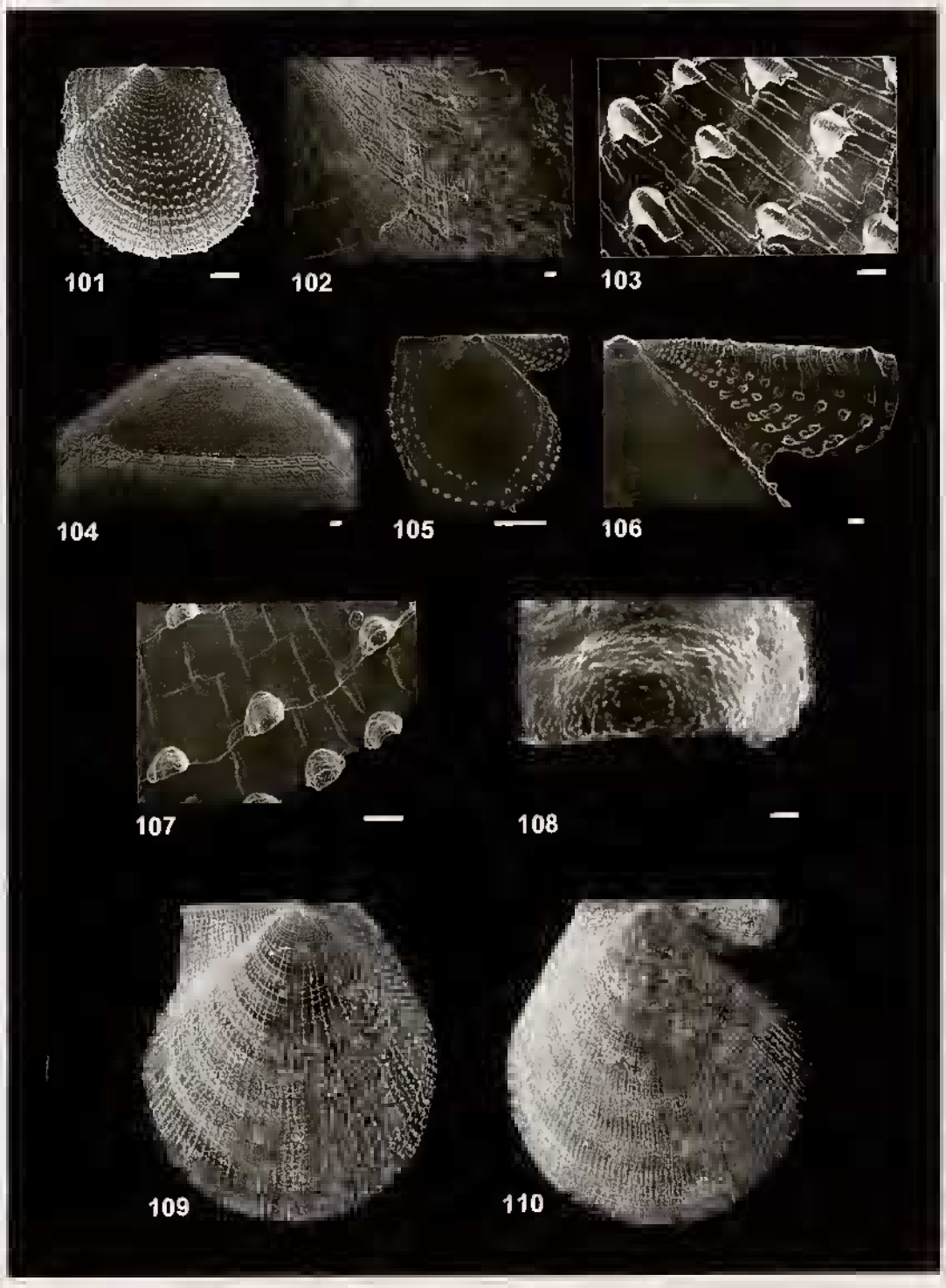
Laevichlamys aliae (Dijkstra, 1988) (comb. nov.)

Figs 132-133

Chlamys aliae Dijkstra, 1988: 17-18, unumbered figs.
Chlamys aliae - DIJKSTRA, 1990: 7, 9. — ROMBOUTS, 1991: 90.

MATERIAL EXAMINED. — The type material (see below).

Indonesia. KARUBAR, *Kai Islands*: stn DW 29, 05°36'S, 132°56'E, 181-184 m, 1 lv. — Stn DW 30, 05°39'S, 132°56'E, 111-118 m, 7 lv, 3rv.



FIGS 101-108. — *Delectopecten alcocki* (E.A. Smith, 1904), KARUBAR, stn CP09: **101**, left valve, exterior, scale bar 1 mm; **102**, left valve, exterior, anterior auricular detail, scale bar 10 µm; **103**, left valve, exterior, antero-ventral detail, scale bar 100 µm; **104**, left valve, exterior, prodissoconch, scale bar 10 µm; **105**, right valve, exterior, scale bar 1 mm; **106**, right valve, exterior, anterior auricle, scale bar 100 µm; **107**, right valve, exterior, antero-ventral detail, scale bar 100 µm; **108**, right valve, exterior, vesicular detail, scale bar 10 µm.

FIGS 109-110. — *D. fluctuatus* (Bavay, 1905), KARUBAR, stn DW 31, 10.0 x 9.1 mm (db): **109**, left valve, exterior; **110**, left valve, interior.

TYPE MATERIAL. — Holotype ZMA Moll.3.88.046, live taken.

TYPE LOCALITY. — Off Punta Engano, Mactan, Cebu, Philippines, 110 m.

DISTRIBUTION. — Philippines and Indonesia; living in 30-200 m (DIJKSTRA, unpubl. data).

REMARKS. — The present specimens are similar to the type material. The shagreen microsculpture and strongly developed radial costae suggest a placement in *Laevichlamys* rather than *Chlamys* Röding, 1798.

Laevichlamys deliciosa (Iredale, 1939) (comb. nov.)

Fig. 134

Mimachlamys deliciosa Iredale, 1939: 350-351, pl. 5, figs 22-22a.
Chlamys deliciosa - DIJKSTRA, 1991: 30 [synonymy, references].

MATERIAL EXAMINED. — The type material (see below).
Indonesia, KARUBAR, *Kai Islands*: stn DW 02, 05°47'S, 132°13'E, 209-240 m, 1 lv. — Stn DW 18, 05°18'S, 133°01'E, 205-212 m, 1 spm. — Stn DW 22, 05°22'S, 133°01'E, 124-850 m, 3 lv.
Tanimbar Islands: stn DW 50, 07°59'S, 133°02'E, 184-212 m, 1 spm.

TYPE MATERIAL. — Holotype AMS C89669.

TYPE LOCALITY. — Low Isles, SE of Lizard Island, N Queensland, GREAT BARRIER REEF EXPED. stn 14, 14°41'S, 145°29'E, 35 m.

DISTRIBUTION. — Western and southwestern Pacific, alive in 80-205 m.

DESCRIPTION. — *Shell* small, commonly 15 mm high, occasionally to *ca.* 25 mm, equivalve, somewhat equilateral, valves convex, auricles very unequal, umbonal angle *ca.* 80-85°. *Prodissoconch* height *ca.* 240 µm. *Both valves* sculptured with numerous fine radial riblets commencing in early growth stage (*ca.* 1 mm) and increasing to *ca.* 45-50 by intercalating riblets towards ventral margin. Radial riblets bear small erect prickly scales. Interspaces microscopically granulated or reticulated, and smooth near ventral margin. Anterior auricles have 9-14 fine radial riblets; posterior auricles have fewer (6-10) and weaker riblets. Postero-dorsal margin of hinge line somewhat declined. Byssal gap small. Active ctenolium present with 4-6 teeth. Colour uniformly cream, pink, orange, red or purple, sometimes also stained.

REMARKS. — Present specimens are almost identical to the type material. Specimens from stations DW 18 and DW 50 reach 22 mm and 24 mm in height.

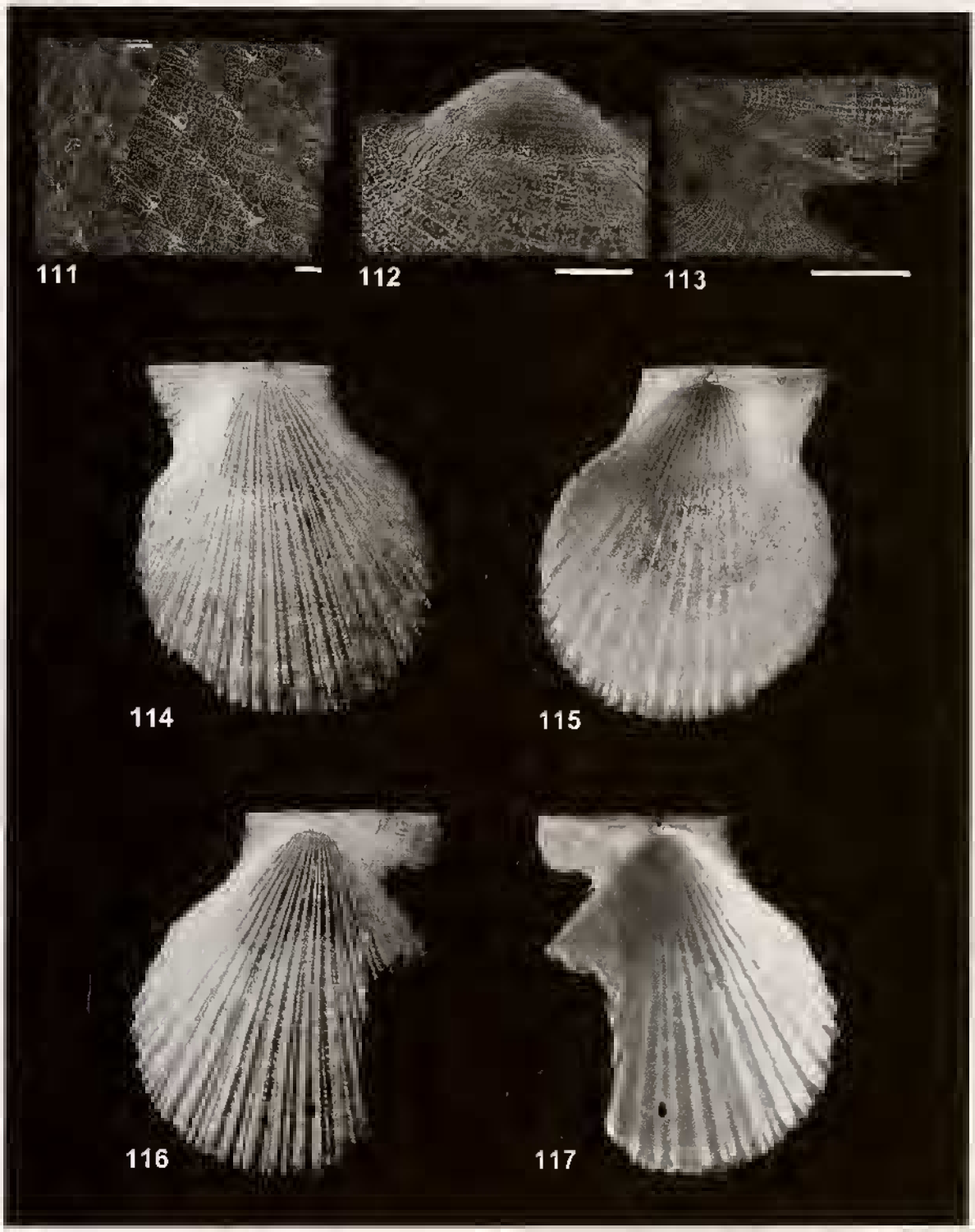
Genus *SEMIPALLIUM* Jousseaume, 1928

Semipallium Jousseaume in LAMY, 1928: 169. Type species (OD): *Pecten tigris* Lamarck, 1819. Recent, Indo-West Pacific.

DIAGNOSIS. — A byssate Chlamydini with shagreen (reticulated) microsculpture, sculptured with regularly spaced primary radial costae, fine secondary radial riblets commonly present at least in late growth stage; auricles very unequal; inner surface undulated; byssal notch moderately deep, ctenolium well developed.

DISTRIBUTION. — Miocene-Recent. Tropical Indo-West Pacific; littoral to sublittoral depths.

REMARKS. — HERTLEIN (1969: N365) considered *Semipallium* as a valid Indo-Pacific genus, placed in the *Decatopecten* group. WALLER (1993: 202) treated it as a genus of Chlamydini.



FIGS 111-113. — *Delectopecten fluctuatus* (Bavay, 1905), KARUBAR, stn DW 31: **111**, left valve, exterior, antero-ventral detail, scale bar 100 µm; **112**, left valve, exterior, prodissoconch, preradial stage, scale bar 100 µm; **113**, right valve, exterior, anterior auricle, ctenolium, scale bar 1 mm.

FIGS 114-117. — *Veprichlamys versipellis* sp. nov., holotype, 23.3 x 19.5 mm (db): **114**, left valve, exterior; **115**, left valve, interior; **116**, right valve, exterior; **117**, right valve, interior.

Semipallium dianae (Crandall, 1979)

Figs 135-137

Chlamys dianae Crandall, 1979: 114, figs 3-8.
Chlamys dianae - MATSUKUMA, OKUTANI & HABE, 1991: 137, 185, pl. 135, fig. 9. — LAN, 1993: 161, 219, fig.
Semipallium dianae - DIJKSTRA, 1991: 38. — ROMBOUTS, 1991: 59, pl. 5, figs 3-3a-b.

MATERIAL EXAMINED. — The type material (see below).
Indonesia. KARUBAR, *Kai Islands*: stn DW 22, 05°22'S, 133°01'E, 124-850 m, 2 lv, 1 rv.

TYPE MATERIAL. — Holotype in the Taiwan Museum, Taipei, Taiwan 7911.

TYPE LOCALITY. — Ryukyu Islands, S Japan, alive, *ca.* 30 m.

DISTRIBUTION. — Western and southwestern Pacific, from southern Japan, the Philippines, Indonesia and the Solomon Islands; alive in 20-55 m (DIJKSTRA, unpubl. data).

DESCRIPTION. — *Shell* commonly *ca.* 35 mm high, occasionally up to *ca.* 50 mm, elongated, slightly convex, equivalve, subequilateral, auricles very unequal, umbonal angle *ca.* 80-90°. *Prodissoconch* height *ca.* 280 µm. *Both valves* covered with shagreen (reticulated) microsculpture and sculptured with 8-10 (commonly 9) regularly spaced, rounded radial costae. Fine radial riblets developed near ventral margin, most prominent on right valve. Anterior auricle with 5-6, posterior auricle with 2-4 radial ribs. Hinge line straight on anterior, somewhat declined on posterior auricle. Inner surface plicated, sometimes striated near ventral margin. Resilifer triangularly oblong, elongated. Byssal fasciole broad, byssal notch relative deep. Ctenolium well developed with 5-7 teeth. Colour very variable, occuring in brown, orange, red, purple and yellow, commonly creamy-yellowish with brown and milky white dots and streaks.

REMARKS. — The present valves from the Kai Islands are similar to the type material, although more monochrome yellow and orange.

Genus *VEPRICHLAMYS* Iredale, 1929

Veprichlamys versipellis sp. nov.

Figs 114-131

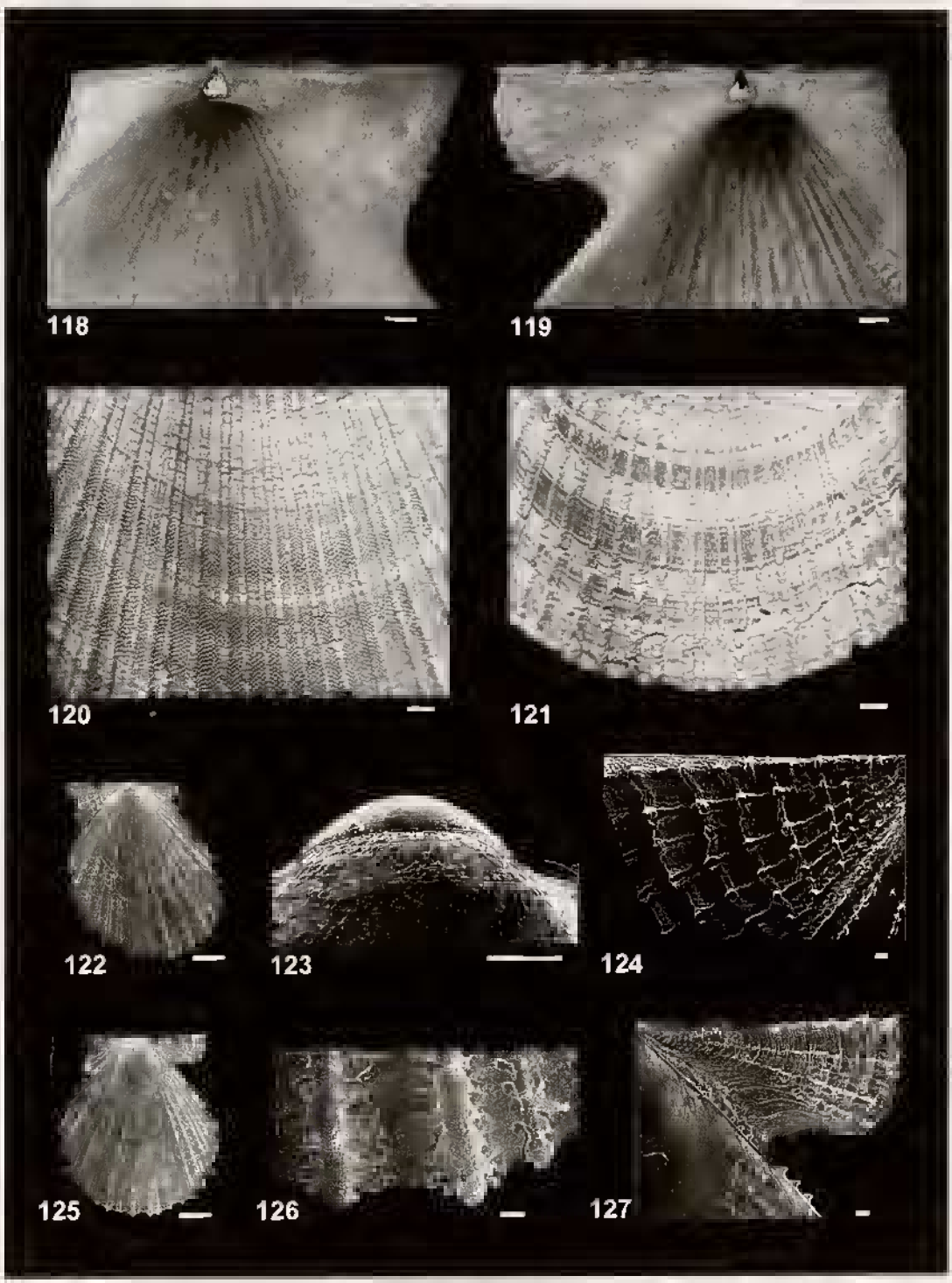
MATERIAL EXAMINED. — **Indonesia**. KARUBAR, *Kai Islands*: stn DW 13, 05°26'S, 132°38'E, 417-425 m, 5 v (MNHN). — Stn CP 33, 06°05'S, 132°38'E, 307-311 m, 1 v (MNHN).
Tanimbar Islands: stn DW 44, 07°52'S, 132°48'E, 291-295 m, 5 v (3 MNHN, 2 LIPI). — Stn CP 46, 08°01'S, 132°51'E, 271-273 m, 1 fresh db (holotype). — Stn DW 61, 09°05'S, 132°44'S, 235-236 m, 14 v (10 MNHN, 4 LIPI). — Stn CP 79, 09°16'S, 131°22'E, 239-250 m, 3 v (1 MNHN, 2 HD). — Stn CP 86, 09°26'S, 131°13'E, 223-225 m, 2 v (MNHN).

TYPE MATERIAL. — Holotype MNHN. Paratypes: 22 MNHN, 6 LIPI, 2 HD.

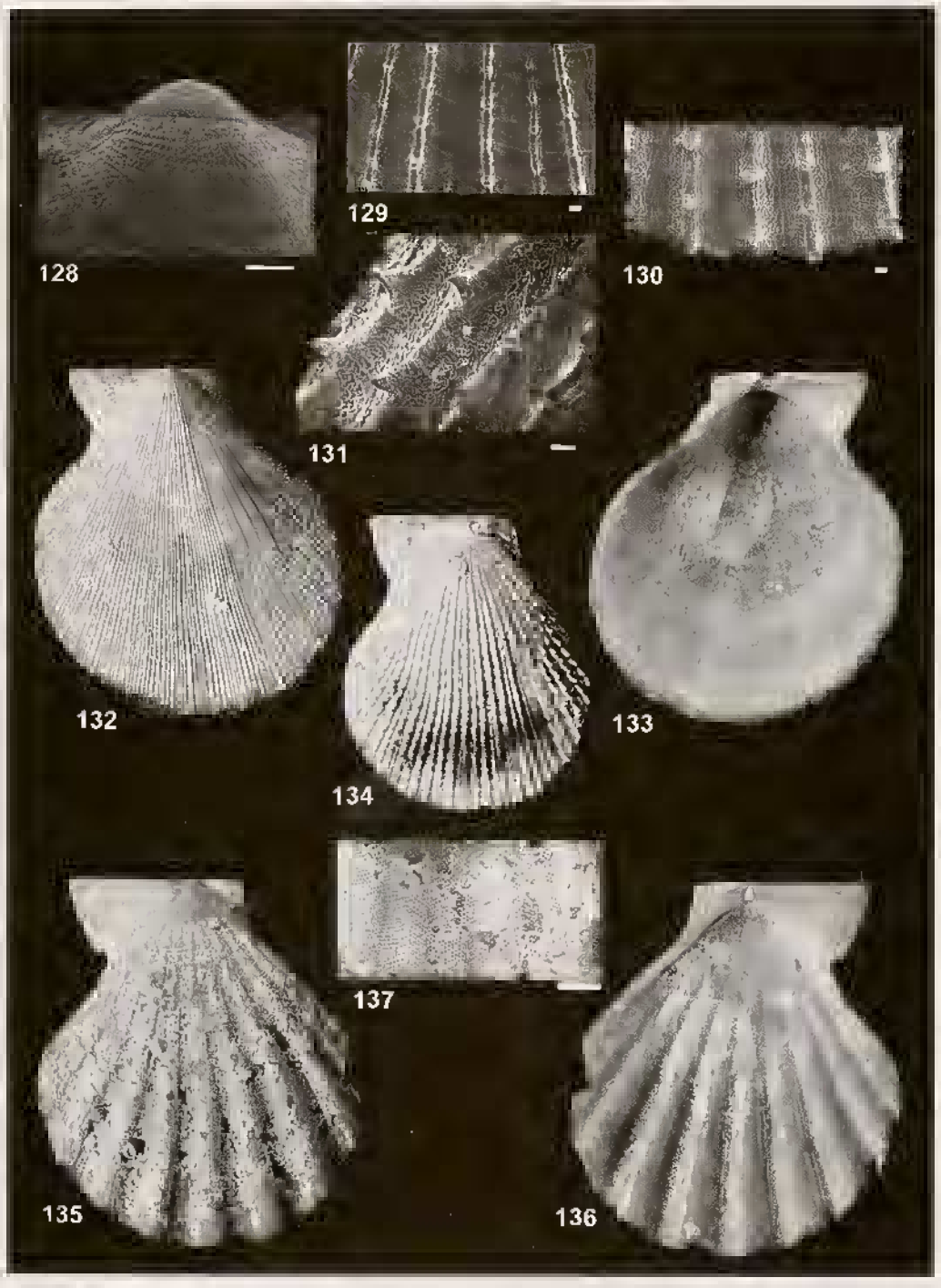
TYPE LOCALITY. — Arafura Sea, E of Tanimbar Islands, KARUBAR, stn CP 46, 08°01'S, 132°51'E, 271-273 m.

DISTRIBUTION. — Banda and Arafura Sea, shells only in 225-417 m.

DESCRIPTION. — *Shell* fragile, up to 35 mm high, somewhat obliquely ovate, compressed, equilateral, equivalve, auricles inequivalve, umbonal angle *ca.* 90°. *Prodissoconch* height *ca.* 280 µm. *Both valves* sculptured with numerous (*ca.* 40) irregularly spaced, primary radial costae, commencing at 1 mm shell height, and *ca.* 12,



FIGS 118-127. — *Veprichlamys versipellis* sp. nov.: **118-119**, holotype: **118**, left valve, interior, dorsal detail, scale bar 1 mm; **119**, right valve, interior, dorsal detail, scale bar 1 mm. — **120-121**, KARUBAR, stn DW 44, paratypes (lv, rv): **120**, left valve, exterior, central detail, scale bar 1 mm; **121**, right valve, exterior, ventral marginal detail, scale bar 1 mm. — **122-127**, KARUBAR, stn CP 86, paratype (db): **122**, left valve, exterior, scale bar 1 mm; **123**, left valve, exterior, prodissoconch, radial stage, scale bar 100 µm; **124**, left valve, exterior, anterior auricle, scale bar 100 µm; **125**, right valve, exterior, scale bar 1 mm; **126**, left valve, exterior, ventral marginal detail, scale bar 100 µm; **127**, right valve, exterior, anterior auricle, etenolium, scale bar 100 µm.



FIGS 128-131. — *Veprichlamys versipellis* sp. nov., KARUBAR, stn CP 86, paratype (db): **128**, right valve, exterior, prodissoconch, preradial stage, scale bar 100 µm; **129**, left valve, exterior, central detail, scale bar 100 µm; **130**, left valve, exterior, ventral marginal detail, scale bar 100 µm; **131**, right valve, exterior, postero-marginal detail, scale bar 100 µm.

FIGS 132-133. — *Laevichlamys aliae* (Dijkstra, 1988), KARUBAR, stn DW 30, 23.8 x 20.6 mm (lv): **132**, left valve, exterior. — **133**, left valve, interior.

FIG 134. — *L. deliciosa* (Iredale, 1939), KARUBAR, stn DW 22, 9.0 x 7.6 mm, left valve, exterior.

FIGS 135-137. — *Semipallium dianae* (Crandall, 1979), KARUBAR, stn DW 22, 25.1 x 21.9 mm (lv): **135**, left valve, exterior; **136**, left valve, interior; **137**, left valve, exterior, central detail, scale bar 1 mm.

secondary radial riblets commencing at central part of disc, and increasing towards ventral margin. Costae squamose. Microsculpture of interspaces variable: early growth stage with diverging striae near anterior and posterior margin, shagreen microsculture above central part of disc and near ventral margin, in between radial striae and diverging to the anterior and posterior margins. Anterior auricle of left valve larger than posterior, sculptured with 10 weakly developed squamous radial lirae; posterior auricle with 6 fine squamous radial lirae, interspaces of early growth stage striae microscopically reticulated. Auricles of right valve sculptured with more prominent radial costae, fewer in number (anterior 6, posterior 5). Anterior hinge line straight, posterior somewhat suppressed. Byssal fasciole broad, byssal notch rather deep. Inactive and active ctenolium beside ledge of suture, with 4 teeth. Postero-lateral margins of disc scarcely gaping. Resilifer elongate triangular. Inner surface of both valves plicate near periphery. Colour creamy with pink-reddish dots and scales. Dimensions (holotype): H 23.4, L 20.0, D 6.1 mm.

REMARKS. — Juvenile specimens resemble *V. jousseaumei* (Bavay, 1904), from the western Pacific, which differs by the absence of intercalating ribs and of the shagreen microsculpture. Adult specimens of *V. versipellis* differ by having shagreen microsculpture on the anterior auricles, on the central part of the disc and near the ventral margin, whereas *V. jousseaumei* has radial striae. *V. versipellis* has many (*ca.* 50), irregularly spaced, radial riblets, *V. jousseaumei* fewer (*ca.* 20), regularly spaced, radial ribs. *V. perillustris* (Iredale, 1925) from southern and southeastern Australia differs having by a more oblique shape, fewer (*ca.* 20) radial ribs, more prominent scales on the ribs, and lack of a shagreen (reticulated) microsculpture. *V. kiwaensis* (Powell, 1933) resembles *V. perillustris* and differs from *V. versipellis* by having fewer (*ca.* 20) regularly spaced radial ribs and more prominent microscopic striae; shagreen microsculpture is absent. *V. incantata* (Hertlein, 1972) from the Galapagos Islands differs by attaining a larger size (*ca.* 45 mm high), having a more elongate shape, a larger convexity of the valves and lacking the shagreen microsculpture.

ETYMOLOGY. — From the Latin *versipellis*, adj. = metamorphosis, with regard to the inconstancy of shell microsculpture.

Tribe AEQUIPECTININI Nordsieck, 1969

Genus ***CRYPTOPECTEN*** Dall, Bartsch & Rehder, 1938

Cryptopecten Dall, Bartsch & Rehder, 1938: 93. Type species (OD): *Cryptopecten alli* Dall, Bartsch & Rehder, 1938. Recent, Hawaii Islands, 95-435 m.

Synonymy and Diagnosis: see DIJKSTRA (1995b: 60).

Cryptopecten bullatus (Dautzenberg & Bavay, 1912)

Figs 138-145

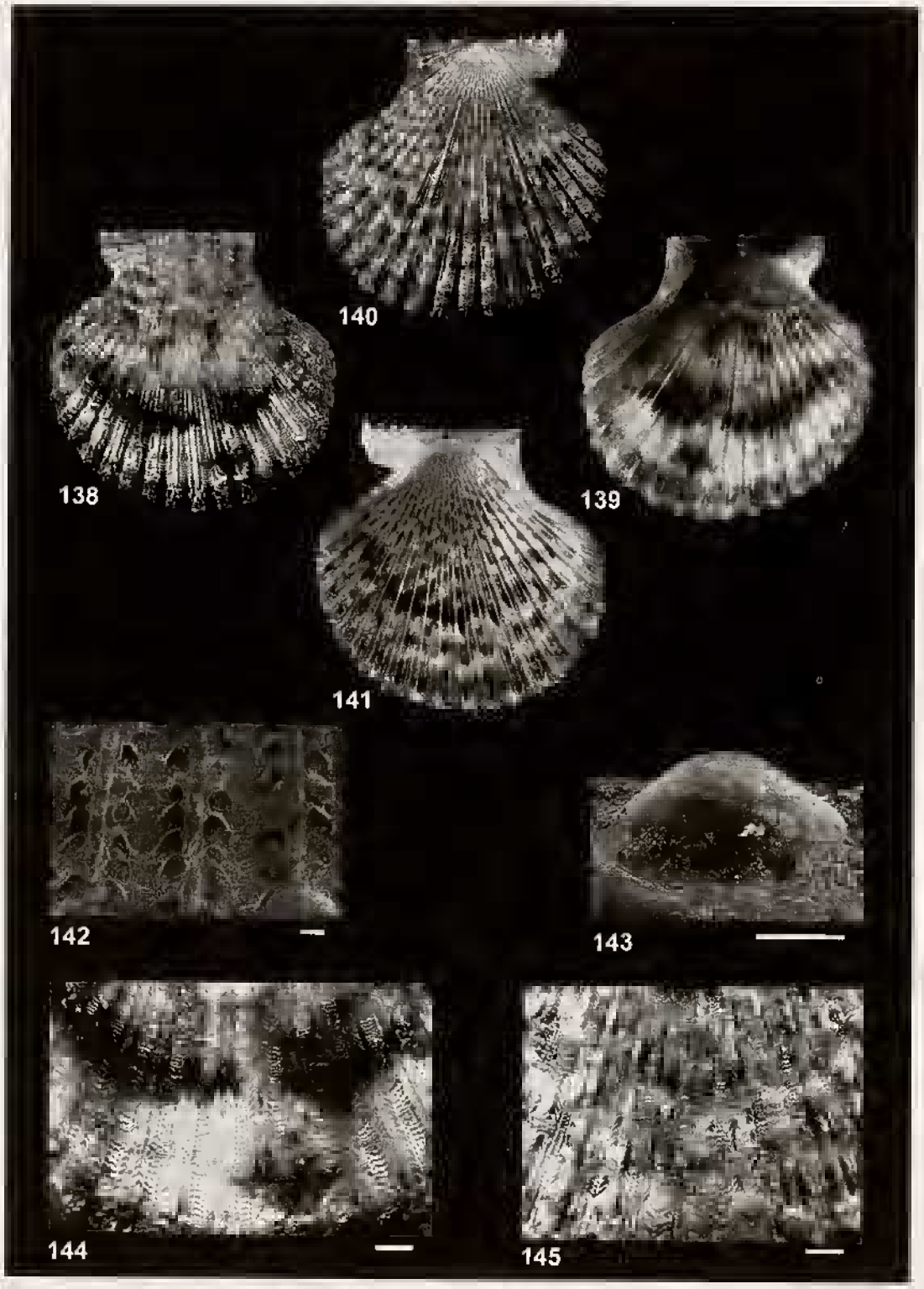
Pecten (Chlamys) bullatus Dautzenberg & Bavay, 1912: 17, pl. 27, figs 1-2.
Cryptopecten bullatus - DIJKSTRA, 1995b: 60, figs 115-118 [synonymy, references, description, discussion].

MATERIAL EXAMINED. — The type material (see DIJKSTRA, 1995b: 60).

Indonesia. CORINDON, *Makassar Strait*: stn B 248, 00°54'S, 119°29'E, 170 m, 3 v.

KARUBAR, *Kai Islands*: stn DW 02, 05°47'S, 132°13'E, 209-240 m, 2 lv. — Stn DW 15, 05°17'S, 132°41'E, 212-221 m, 5 lv, 6 rv. — Stn DW 18, 05°18'S, 133°01'E, 205-212 m, 2 spms, 2 lv, 2 rv. — Stn DW 24, 05°32'S, 132°51'E, 230-243 m, 1 lv, 3 rv. — Stn DW 29, 05°36'S, 132°56'E, 181-184 m, 1 rv. — Stn DW 30, 05°39'S, 132°56'E, 111-118 m, 4 lv, 1 rv. — Stn DW 32, 05°47'S, 132°51'E, 170-206 m, 1 lv.

Tanimbar Islands: stn DW 44, 07°52'S, 132°48'E, 291-295 m, 4 lv. — Stn CP 47, 08°01'S, 132°55'E, 235-246 m, 1 rv. — Stn DW 49, 08°00'S, 132°59'E, 206-210 m, 1 lv, 2 rv. — Stn DW 50, 07°59'S, 133°02'E, 184-186 m, 1 lv. — Stn DW 61, 09°05'S, 132°44'E, 235-236 m, 2 lv, 1 rv. — Stn CP 79, 09°16'S, 131°22'E, 239-250 m, 1 rv. — Stn DW 80, 09°37'S, 131°02'E, 199-201 m, 1 lv. — Stn CP 86, 09°26'S, 131°13'E, 223-225 m, 2 spms, 1 lv, 1 rv.



FIGS 138-145. — *Cryptopecten bullatus* (Dautzenberg & Bavay, 1912): **138-141**, KARUBAR, stn DW 18, 19.4 x 19.9 mm (db): **138**, left valve, exterior; **139**, left valve, interior; **140**, right valve, exterior; **141**, right valve, interior. — **142-145**, KARUBAR, stn DW 24: **142**, right valve, exterior, central detail, scale bar 100 µm; **143**, right valve, exterior, prodissoconch, scale bar 100 µm; **144**, left valve, exterior, ventral marginal detail, scale bar 1 mm; **145**, right valve, exterior, ventral marginal detail, scale bar 1 mm.

DISTRIBUTION. — Throughout the western, southwestern and Central Pacific; also known from the western Indian Ocean; present specimens from 111-295 m, alive in 212-223 m.

Cryptopecten nux (Reeve, 1853)

Figs 146-149

Pecten coruscans Reeve, 1853: sp. 143, pl. 32, fig. 143 (*non* Hinds, 1845).
Pecten nux Reeve, 1853: *errata*.
Cryptopecten nux nux - HAYAMI, 1984: 100, pl. 2, fig. 4, pl. 3, figs 1-2, pl. 9, figs 2-5, pl. 12, figs 1-2 [synonymy, references, description, discussion].

MATERIAL EXAMINED. — The type material (see below).
Indonesia. CORINDON, *Makassar Strait*: stn B 248, 00°54'S, 119°29'E, 170 m, 3 v.
KARUBAR, *Kai Islands:* stn DW 01, 05°46'S, 132°10'E, 156-305 m, 5 lv, 2 rv. — Stn DW 02, 05°47'S, 132°13'E, 209-240 m, 3 lv, 2 rv. — Stn DW 22, 05°22'S, 133°01'E, 124-850 m, 7 lv, 18 rv.

TYPE MATERIAL. — Lectotype BMNH 1950.11.14.52, designated by WAGNER (1989).

TYPE LOCALITY. — Panglao, Bohol, Philippines (restricted by WAGNER, 1989).

DISTRIBUTION. — Western and northwestern Indian Ocean, western and southwestern Pacifc, alive in 30-200 m (DIJKSTRA, unpubl. data).

Genus *HAUMEA* Dall, Bartsch & Rehder, 1938

Haumea Dall, Bartsch & Rehder, 1938: 86. Type species (OD): *Haumea juddi* Dall, Bartsch & Rehder, 1938 (= *Pecten loxoides* G.B. Sowerby II, 1882). Recent, Hawaiian Islands, 7-15 m.

DIAGNOSIS. — Free swimming Aequipectinini, slightly obliquely suborbicular, right valve more convex than left, auricles subequal, valves sculptured with 18-20 radial costae, interspaces with fine concentric lamellae, auricles weakly sculptured with 4-6 radial riblets and fine close-set concentric lamellae, byssal notch moderately deep, ctenolium present.

DISTRIBUTION. — Pliocene-Recent. Western Indian Ocean, western and southwestern Pacific; littoral to sublittoral depths.

REMARKS. — HERTLEIN (1969: N357) treated *Haumea* as a synonym of *Argopecten* Monterosato, 1899, a subgenus of *Chlamys*. WALLER (1991: 32) placed *Argopecten* in the *Aequipecten* group, or Aequipectinini (1993 : 198). *Haumea* differs from *Argopecten* by having a more compressed, and somewhat obliquely orbicular left valve (in *Argopecten* more convex and elongate, especially in young specimens) and smaller, subequal auricles (in *Argopecten* larger, inequal with a prominent anterior auricle in the right valve). Microsculpture of *Haumea* is finer with more closely spaced concentric lamellae. The genus includes *H. inaequivalvis* (G.B. Sowerby II, 1842), *H. loxoides* and *H. rehderi* (Grau, 1960). *Argopecten* is not known in the Indo-Pacific region.

Haumea inaequivalvis (G.B. Sowerby II, 1842)

Fig. 150

Pecten inaequivalvis Sowerby, 1842: 50, pl. 19, figs 193, 194, 195.
Pecten inaequivalvis - REEVE, 1852: sp. 1, pl. 1, figs 1, 6. — DESHAYES, 1863: 31. — MARTENS, 1880: 138. — MELVILL & STANDEN, 1898: 46.
Vola inaequivalvis - H. & A. ADAMS, 1858: 554. — DUNKER, 1882: 244.

Pecten (Vola) inaequivalvis - KÜSTER & KOBELT, 1888: 236, pl. 62, figs 5-8.
Chlamys (Aequipecten) inaequivalvis - DAUTZENBERG & BOUGE, 1933: 426.
Chlamys inaequivalvis - KIRA, 1962: 137, pl. 49, fig. 13.
Haumea inaequivalvis - DIJKSTRA, 1984b: 28, 4 figs. — ROMBOUTS, 1991: 43, pl. 25, fig. 1.
Cryptopecten inaequivalvis - BERNARD, CAI & MORTON, 1993: 50.

MATERIAL EXAMINED. — The type material (see below).
Indonesia. KARUBAR, *Kai Islands*: stn DW 30, 05°39'S, 132°56'E, 111-118 m, 1 rv.

TYPE MATERIAL. — Lectotype, here designated, the shell figured by REEVE (1852: pl. 1, fig. 6; H 30.8, L 33.5, D 13.5 mm) BMNH 1994126/1. Two paralectotypes: BMNH 1994126/2-3.

TYPE LOCALITY. — Philippine Islands.

DISTRIBUTION. — Western and northeastern Indian Ocean, western, southwestern and central South Pacific; alive in 3-46 m (DIJKSTRA, unpubl. data).

DESCRIPTION. — *Shell* rather small, usually 20 mm high, occasionally up to *ca.* 30 mm, suborbicular, inequivalve, right valve more convex than left, auricles unequal, umbonal angle *ca.* 100-110°. *Prodissoconch* height *ca.* 220 µm. *Both valves* sculptured with 18-20 regularly spaced, prominent radial costae. Radial ribs near anterior and posterior margin weakly concentrically striated. Interspaces between radial costae with concentric lamellae. Auricles sculptured with 2-4 weak radial riblets. Inner surface strongly plicated near ventral margin. Hinge line straight. Byssal notch moderately deep. Resilifer obliquely triangular. Active ctenolium weak, with 4-5 teeth. Colour blackish grey or brownish marked with a few white spots and black streaks, right valve whitish or light brown.

REMARKS. — The present young specimen is similar to the type material. Young specimens could be easily confused with the closely related species *Haumea rehderi* (Grau, 1960) from the same region, which differs by having more prominent and widely spaced concentric lamellae between the radial costae, more prominent radial riblets on the auricles, and a deeper byssal notch. *Haumea loxoides* differs by having a more fragile shell, a more oblique shape, and a creamy mottled with red colour.

Genus ***VOLACHLAMYS*** Iredale, 1939

Volachlamys Iredale, 1939: 356. Type species (OD): *Pecten cumingii* Reeve, 1853. Recent, Queensland, Australia.

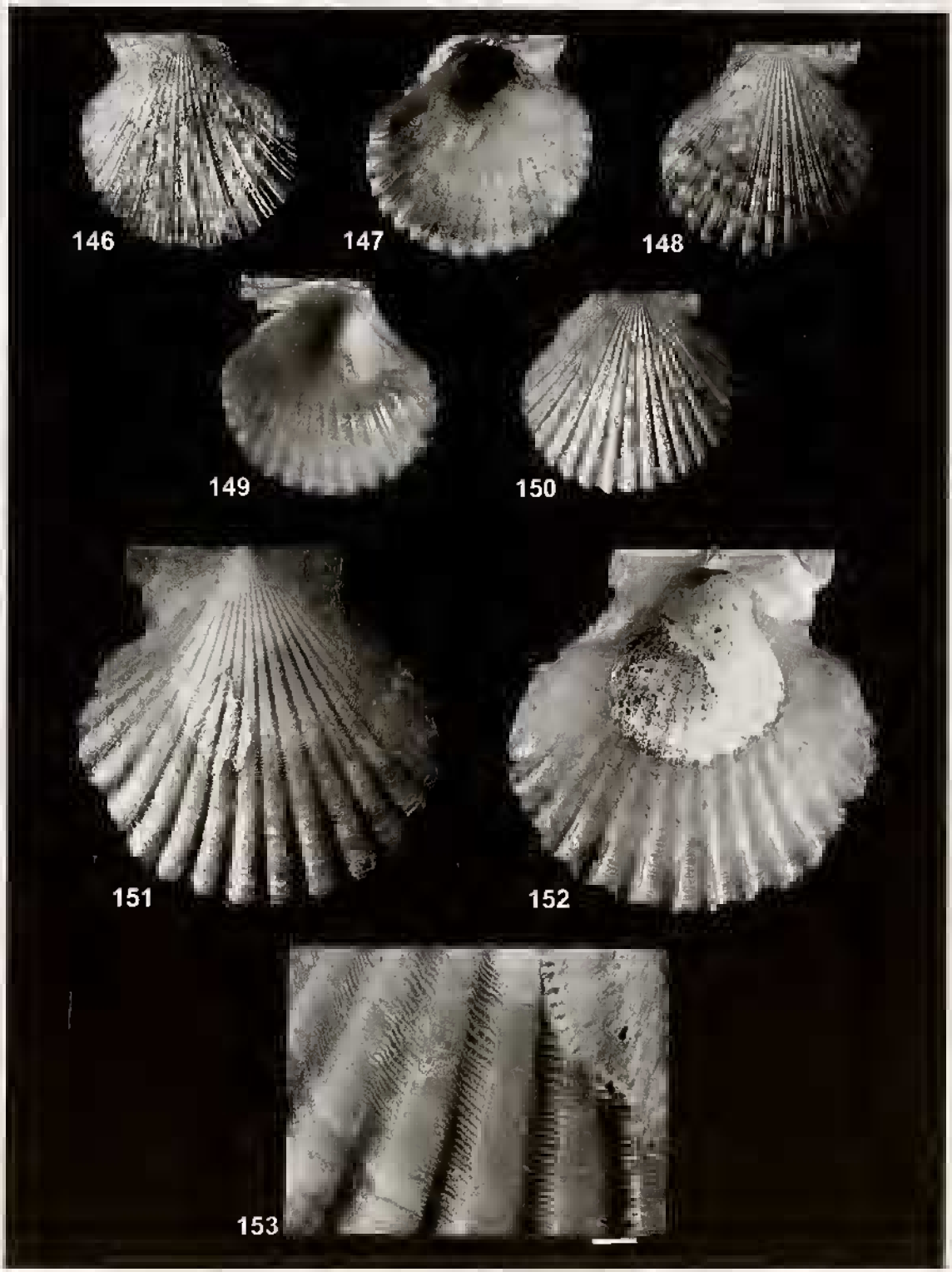
DIAGNOSIS. — Non-cemented, free swimming Aequipectinini, orbicular, equilateral, subequivalve, auricles subequal, valves sculptured with 14-24 radial costae, interspaces with concentric lamellae, byssal notch well-developed and moderately deep, ctenolium present.

DISTRIBUTION. — ?Miocene-Recent (HAYAMI, 1989: 16). Indo-West Pacific; intertidal to sublittoral depths.

Volachlamys singaporina (G.B. Sowerby II, 1842)

Figs 151-155

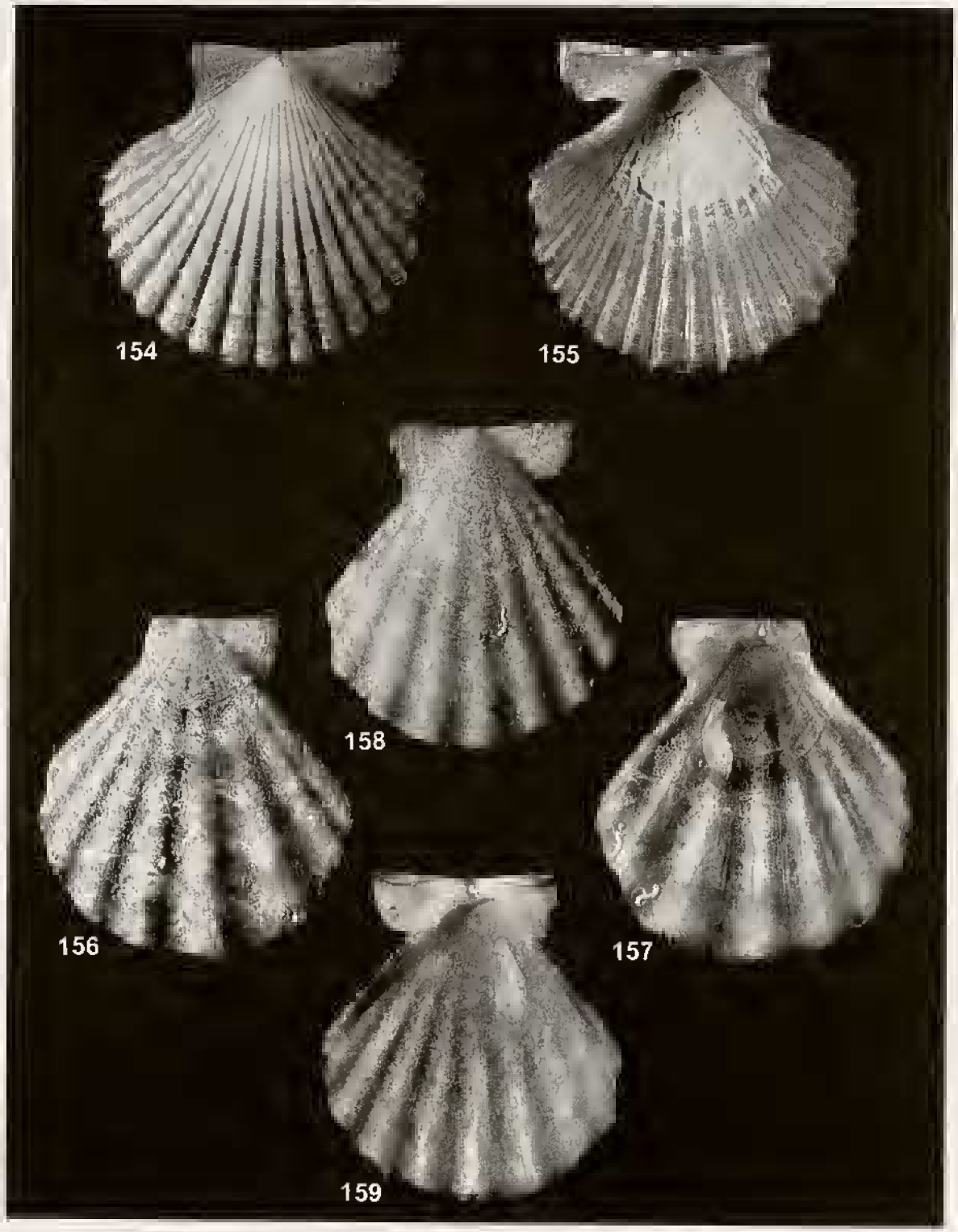
Pecten singaporinus G.B. Sowerby II, 1842: 74, pl. 13, fig. 55, pl. 14, fig. 71.
Pecten pica Reeve, 1853: sp. 115, pl. 27, figs 115 a-b.
Pecten singaporinus - REEVE, 1853: sp. 74, pl. 20, fig. 74. — KÜSTER & KOBELT, 1888: 94, pl. 25, figs 2-4.
Pecten pica - KÜSTER & KOBELT, 1888: 255-256, pl. 67, figs 1-2.
Chlamys (Argopecten) singaporina - DIJKSTRA, 1990: 8.
Volachlamys singaporina - ROMBOUTS, 1991: 62, pl. 22, fig. 6. — DHARMA, 1992: 84, pl. 20, figs 7-7a-d.
Chlamys singaporina - BERNARD, CAI & MORTON, 1993: 49.



FIGS 146-149. — *Cryptopecten nux* (Reeve, 1853), KARUBAR, stn DW 22, 6.9 x 6.9 mm (lv), 6.1 x 6.2 mm (rv): **146**, left valve, exterior; **147**, left valve, interior; **148**, right valve, exterior; **149**, right valve, interior.

FIG. 150. — *Haumea inaequivalvis* (G.B. Sowerby II, 1842), KARUBAR, stn DW 30, 6.0 x 6.8 mm, right valve, exterior.

FIGS 151-153. — *Volachlamys singaporina* (G.B. Sowerby II, 1842), KARUBAR, stn CP 65, 36.5 x 37.1 mm (lv): **151**, left valve, exterior; **152**, left valve, interior; **153**, left valve, exterior, antero-central detail, scale bar 1 mm.



FIGS 154-155. — *Volachlamys singaporina* (G.B. Sowerby II, 1842), KARUBAR, stn CP 65, 32.8 x 33.9 mm (rv): **154**, right valve, exterior; **155**, right valve, interior.

FIGS 156-159. — *Anguipecten* cf. *picturatus* Dijkstra, 1995, KARUBAR, stn DW 30, 26.6 x 24.5 mm (lv), 21.4 x 20.0 mm (rv): **156**, left valve, exterior; **157**, left valve, interior; **158**, right valve, exterior; **159**, right valve, interior.

MATERIAL EXAMINED. — The type material (see below).
Indonesia. KARUBAR, *Tanimbar Islands*: stn DW 64, 09°13'S, 132°31'E, 179-180 m, 3 lv. — Stn CP 65, 09°14'S, 132°27'E, 174-176 m, 10 lv, 7 rv.

TYPE MATERIAL. — *P. singaporinus*: lectotype (H 54.2, L 54.7, D 15.9 mm) BMNH 1994127/1, here designated. Two paralectotypes: BMNH 1994127/2-3. — *P. pica*: three syntypes BMNH 1994139.

TYPE LOCALITY. — *P. singaporinus*: Singapore. — *P. pica*: "New Zealand" [incorrect locality].

DISTRIBUTION. — Throughout the southwestern Pacific to northern Australia; alive from intertidal to subtidal depths. Present specimens probably washed into deep water.

DESCRIPTION. — *Shell* up to *ca.* 45 mm high, suborbicular, equilateral, equivalve, very compressed, auricles unequal, umbonal angle *ca.* 90°. *Prodissoconch* height *ca.* 260 µm. *Both valves* sculptured with 18 to 24 (commonly 20 to 22) regularly spaced, smooth rounded radial costae. Interspaces between radial costae with fine concentric lamellae. Anterior auricle of left valve sculptured with 6-8 weak radial riblets and very fine close-set concentric lamellae; riblets nearly absent on posterior auricle. Hinge line straight. Byssal notch moderately deep. Ctenolium well-developed with 4-6 teeth. Resilifer triangular oblong. Inner side with prominent plicae near ventral margin. Colour greyish or creamy with brown and/or whitish maculations and streaks.

REMARKS. — Present specimens are similar to the original and subsequent descriptions and illustrations by REEVE (1853), although with fewer radial costae (18-20). SOWERBY (1842) mentioned 24, REEVE (1853) *ca.* 22 and KÜSTER & KOBELT (1888) 20-22 radial costae. Material examined from throughout the southwestern Pacific, South China Sea, Malaysia and Indonesia (BMNH, HD, MNHN, RMNH, ZMA) shows variation in number of radial costae, decreasing to eastern Indonesia and northeastern Australia. It is possible that *V. cumingii* (Reeve, 1853) from Queensland is only a geographical variant (under study).

Subfamily PECTININAE Wilkes, 1810
Tribe DECATOPECTININI Waller, 1986

Genus *ANGUIPECTEN* Dall, Bartsch & Rehder, 1938

Anguipecten Dall, Bartsch & Rehder, 1938: 92. Type species (OD): *Anguipecten gregoryi* Dall, Bartsch & Rehder, 1938 (= *Pecten lamberti* Souverbie *in* SOUVERBIE & MONTROUZIER, 1874). Recent, Hawaiian Islands, 470-571 m .

DIAGNOSIS. — Free swimming Decatopectinini, suborbicular, laterally compressed, with 9-40 rounded radial costae, sculptured with very closely spaced commarginal lamellae, auricles subequal to equal, byssal notch nearly absent, no byssal fasciole, ctenolium weakly developed.

DISTRIBUTION. — Miocene-Recent. Indo-West Pacific; littoral to sublittoral depths.

Anguipecten cf. *picturatus* Dijkstra, 1995

Figs 156-159

Pecten aurantiacus A. Adams & Reeve *in* A. ADAMS, 1850: 74, pl. 21, fig. 12 (*non* Röding, 1798, *nec* J. Sowerby, 1820, *nec* Defrance, 1825).
Anguipecten picturatus Dijkstra, 1995a: 17 (*nom. nov.* for *P. aurantiacus* Adams & Reeve).
Pecten aurantiacus - REEVE, 1853: sp. 105, pl. 26, fig. 105. — KÜSTER & KOBELT, 1888: 171, pl. 47, fig. 7.
Gloripallium aurantiacum - MASUDA, 1962: 197.
Anguipecten lamberti - ABBOTT & DANCE, 1982: 312, fig. (*non* Souverbie *in* Souverbie & Montrouzier, 1874).
Anguipecten aurantiacus - DIJKSTRA, 1984a: 9, figs; 1991: 41.

Bractaechlamys (sic) aurantiaca - MATSUKUMA, OKUTANI & HABE, 1991: 185, pl. 134, fig. 4.
Decadopecten (Anguipecten) aurantiacus - ROMBOUTS, 1991: 38, pl. 13, fig. 12.
Bractechlamys aurantiaca - BERNARD, CAI & MORTON, 1993: 50. — LAN, 1993: 161, fig.

MATERIAL EXAMINED. — The type material (see below).
Indonesia. KARUBAR, *Kai Islands*: stn DW 30, 05°39'S, 132°56'E, 111-118 m, 2 lv, 2 rv.

TYPE MATERIAL. — Holotype BMNH 1950.11.14.8.

TYPE LOCALITY. — "China Sea" [= South China Sea].

DISTRIBUTION. — Western Indian Ocean, western and southwestern Pacific; alive in subtidal to sublittoral waters (2-90 m) (DIJKSTRA, unpubl. data).

DESCRIPTION. — Present specimens of the Kai Islands are up to 25 mm high, somewhat triangularly elongated, nearly equilateral and equivalve, right valve slightly more convex than left valve, auricles subequal, umbonal angle 85°. *Prodissoconch* heigh *ca.* 250 µm. *Both valves* undulated and sculptured with 7 rounded radial costae. Microsculpture consisting of very fine and closely set, commarginal lamellae. Faint secondary radial riblets developed on radial costae near ventral margin. Auricles weakly sculptured with 4-5 radial riblets. Hinge line straight, somewhat raised on right valve. Inner surface plicated, more prominently so near periphery. Resilifer triangular, erected. Byssal notch very small, byssal fasciole absent. Ctenolium weakly developed with 3 teeth. Colour creamy, maculated with dots and streaks, right valve more uniform and paler.

REMARKS. — The present valves differ strongly from the type material of *P. aurantiacus* by having a more orbicular shape (typical specimens are more elongated), fewer 7 vs 9-15) radial costae and are nearly lacking secondary radial riblets on costae (strongly developed and scabrous in typical specimens). The shape is somewhat similar to *Mirapecten rastellum* (Lamarck, 1819), but the latter is sculptured with strongly erected scales on the radial costae and dorsal margin of right valve. The byssal notch is also wider than in *M. rastellum* and the auricles are larger.

DISCUSSION

A total of 19 species of Propeamussiidae and 11 species of Pectinidae are present in the material from the KARUBAR cruise in the Arafura Sea. Twenty-eight species (18 propeamussiids and 10 pectinids) were collected near the Kai Islands, and twelve species (6 each of propeamussiids and pectinids) near the Tanimbar Islands. Two species (*Parvamussium conspectum* and *Veprichlamys versipellis*) are new to science, and 8 are new records for Indonesia: *Propeamussium alcocki*, *P. investigatoris*, *P. rubrotinctum*, *Parvamussium squalidulum*, *P. thetidis*, *P. vesiculatum*, *Delectopecten fluctuatus*, and *Haumea inaequivalvis*.

There are 33 stations without pectinoids and 26 stations have only one species. Five stations (02, 13, 29, 31, 32) have six species and station 18 has seven species (3 of them live-taken). Half of the species are represented by at least one live-taken sample, others only by empty shells. *Haumea inaequivalvis* and *Volachlamys singaporina* are intertidal to subtidal species and the KARUBAR records represent empty shells carried downslope to water depths where the species is apparently not normally living. Other than these two species, the depth range indicated by empty shells appears compatible with what is known for the relevant species elsewhere in the Indo-Pacific.

The Kai Islands were selected as the site of the Danish 1922 and KARUBAR 1991 Expeditions because MORTENSEN had hypothesized that deep-sea species occured there at considerably shallower depths than elsewhere in the world. Ten species of Pectinoidea were collected alive during both the KARUBAR and New Caledonia dredging programs (DIJKSTRA, 1995b) and in this respect it may be of interest to compare their bathymetric range in the two regions (Table 1). *Propeamussium alcocki* appears to range deeper in the Arafura Sea than in New Caledonia, but the first occurence of 8 species is shallower or considerably shallower in the Arafura Sea than in New Caledonia. The limited evidence available thus appears to support MORTENSEN's hypothesis.

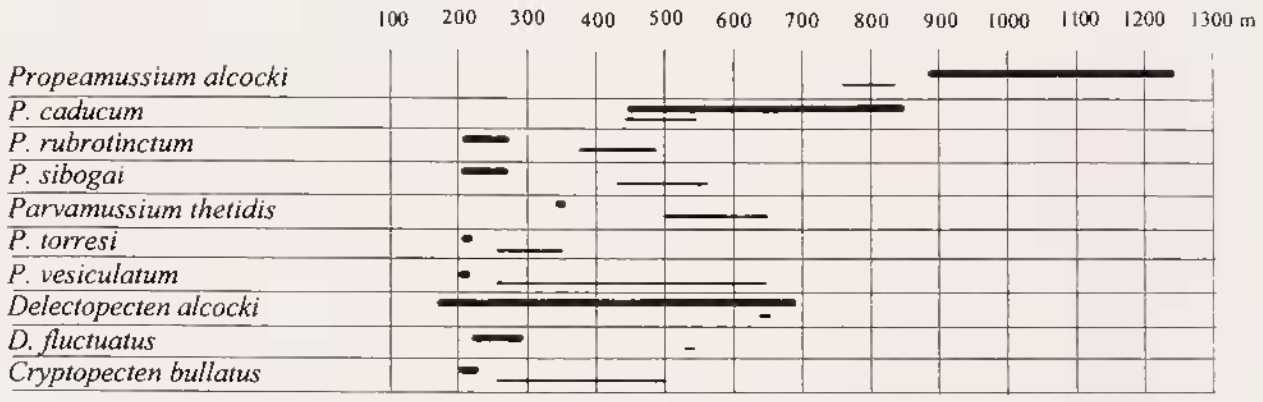


TABLE 1. — Bathymetric range of Pectinoidea in the Arafura Sea (thick bar) and New Caledonia (thin line).

The Indonesian archipelago has been touched by several major expeditions (*Challenger*, *Valdivia*, *Galathea*), and was the main focus of several specific ones (*Siboga*, SNELLIUS-II, KARUBAR). A total of 43 deep-water pectinoids are now recorded from the archipelago (Table 2, next page), with most of present knowledge based on the last three mentioned expeditions. Despite this collecting effort, the deep-sea fauna of Indonesia is still probably very incompletely known:

(a) Seventeen species (40%) were first discovered or recorded during the recent SNELLIUS-II (1984-85) and KARUBAR (1991) expeditions.

(b) Nine species (21%) taken during the historical *Challenger*, *Valdivia* and *Siboga* expeditions have never been taken again since then in Indonesian waters.

(c) In the KARUBAR material, on average, each species is present at 4.4 stations, but there is considerable variation in occurence patterns, with *Delectopecten alcocki* present at 23 stations and 9 species present at single stations. The new species and species representing new records for Indonesia are present on average at 3.9 stations: it thus seems that they are not significantly rarer than the species already known from Indonesia, which are present on average at 4.7 stations.

This indicates that rather many more species of Pectinoidea will probably be discovered when new regions of the Indonesian archipelago will be properly sampled.

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	CH	VA	SI	GA	SN	KA
Propeamussium alcocki						+
P. caducum		+	+		+	+
P. ina			+			+
P. investigatoris			+			+
P. manaricum		+				
P. rubrotinctum						+
P. sibogai			+	+		+
P. siratama			+			+
P. watsoni	+			+		
Parvamussium araneum					+	+
P. carbaseum					+	+
P. cassium					+	+
P. conspectum					+	+
P. cristatellum			+		+	+
P. dautzenbergi			+			
P. lacteum			+			
P. pauciliratum					+	+
P. scitulum			+		+	+
P. squalidulum						+
P. texturatum			+		+	
P. thetidis						+
P. torresi			+			+
P. undosum					+	
P. vesiculatum						+
P. virgatum					+	+
P. zoniferum			+			
Cyclopecten aequatorialis		+				
C. bavayi			+			
C. cancellus					+	
Similipecten eous					+	
Catillopecten translucens			+			
Pectinella aequoris					+	
Delectopecten alcocki		+			+	+
D. fluctuatus						+
D. musorstomi			+		+	
Pseudohinnites levii			+			
Hyalopecten tydemani			+		+	
Laevichlamys aliae			+			+
L. deliciosa			+		+	+
L. gladysiae			+		+	
Veprichlamys versipellis						+
Cryptopecten bullatus			+		+	+
C. nux			+		+	+

TABLE 2. — Pectinoidea from Indonesia normally occuring in depths deeper than 100 m, as collected by the *Challenger* (CH), *Valdivia* (VA), *Siboga* (SI), *Galathea* (GA), SNELLIUS-II (SN) and KARUBAR (KA) Expeditions.

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